COUNTWAY LIBRARY
HC 52EF M

THE BLIND MAN'S WORLD

(Dr. E. JAVAL'S ENTRE AVEUGLES)

BOSTON MEDICAL LIBRARY.

PURCHASED .....

BY THE

"Francis Minot" Fund.

NULLA DIES SINE LINEA

Dr. Javal and his Attendant on the Tandem Tricycle.

THE BLIND MAN'S WORLD

AN ENGLISH VERSION

OF

ENTRE AVEUGLES:

ADVICE TO PEOPLE WHO HAVE RECENTLY LOST THEIR SIGHT.

BY

DR. ÉMILE JAVAL,

DIRECTEUR HONORAIRE DU LABORATOIRE D'OPHTALMOLOGIE
DE L'ÉCOLE DES HAUTES ÉTUDES,
MEMBRE DE L'ACADÉMIE DE MÉDECINE.

TRANSLATED BY

W. ERNEST THOMSON,

M.A., M.D.,

FELLOW OF THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW,
SURGEON TO THE GLASGOW EYE INFIRMARY,
OPHTHALMIC SURGEON GLASGOW MATERNITY HOSPITAL,
FORMERLY PROFESSOR OF PHYSIOLOGY IN ANDERSON'S COLLEGE
MEDICAL SCHOOL, ETC.

LONDON:

PRINTED AND PUBLISHED BY
GEORGE PULMAN AND SONS, LTD., THAYER STREET, W.

1904.

28.Bb.13

4685

BOSTON MEDICAL LIBRARY
MAR 17 1905

BY THE SAME AUTHOR.

Du strabisme dans ses applications à la théorie de la vision, in-8°. Paris, Masson, 1868.

Helmholtz. Optique physiologique, traduction française par Javal et Klein. Paris, Masson, 1868.

Hygiène des écoles primaires. Paris, Masson, 1881.

Mémoires d'ophtalmométrie, in-8°. Paris, Masson, 1886.

Méthode d'enseignement de la lecture par l'écriture, deux petits livrets in-18. Paris, Picard et Kaan, 1893.

Physiologie de l'écriture, brochure in-8°. Picard et Kaan.

Manuel du strabisme, vol. grand in-18, avec collection d'images stéréoscopiques. Paris, Masson, 1896.

Nombreux mémoires, dans les *comptes rendus de la Société de Biologie,* la *Revue scientifique,* les *Annales d'oculistique,* etc., Voir en particulier dans les *Annales d'oculistique* (1878 et 1879), une série d'articles sur la "physiologie de la lecture."

TRANSLATOR'S PREFACE.

The scope of Dr. Javal's "Entre Aveugles" is so well defined by himself that any remarks by way of introduction to English readers are hardly necessary. Further, the original has been so well received, and indeed so extensively quoted by reviewers, that no apology is called for in thus widening its circulation. A German Edition is in course of publication, and considerable portions of the book have appeared at various times in the embossed magazines.

I may, however, be permitted to say one or two words. The title, although clear enough in French, presented such great difficulties that it was necessary to give the English version a new title. In seeking for a suitable one the contents of the book were carefully considered, and eventually "The Blind Man's World" was submitted to the author, who accepted it.

One or two difficulties occurred in the translation of certain terms. In most instances the French words have been placed in brackets after these.

English Braille readers should note that in France the grooves of Barbier are used, not the little cups to which they are accustomed. I have the author's sanction for the translation of "tablettes perforées." by "Braille frame."

The BLIND MAN'S WORLD differs slightly from the original, since it embodies additions and alterations prepared by the author for a second edition.

The work of translation has given me much pleasure; nay, more, it has given me an insight into many things of which I was previously ignorant. It has, in fact, introduced me to the blind man's world.

My best thanks are due to Dr. E. Javal, and to his son, Dr. A. Javal, for their unfailing courtesy and assistance, and to Mr. Sydney Stephenson, Editor of "The Ophthalmoscope," for much kind help in seeing the work through the press.

The translation has also been gone over by Drs. E. and A. Javal and by Madame E. Javal, the latter of whom made several very apposite criticisms upon it.

W. E. T.

2, SOMERSET PLACE,
GLASGOW.

September, 1904.

TABLE OF CONTENTS.

Chap.		Page.
	TRANSLATOR'S PREFACE	v.
	INTRODUCTION	1
I.	DEPENDENCE AND FREEDOM	5
II.	OTHER SENSES AS SUBSTITUTES FOR VISION	8
III.	DOMESTIC OCCUPATIONS	17
IV.	PROFESSIONAL PURSUITS	19
V.	CLEANLINESS, HYGIENE, AND HEALTH	27
VI.	THE DWELLING	31
VII.	MEALS	34
VIII.	WATCHES AND CLOCKS	37
IX.	WALKING IN TOWN AND COUNTRY	39
X.	THE TANDEM TRICYCLE	44
XI.	TRAVELLING	49
XII.	RELATIONS WITH THE WORLD OUTSIDE	53
XIII.	READING ALOUD	56
XIV.	WRITING BY HAND	60
XV.	THE TYPEWRITER AND THE PHONOGRAPH	65
XVI.	BRAILLE READING AND WRITING	67
XVII.	CORRESPONDENCE WITH THE SIGHTED	82
XVIII.	GEOGRAPHICAL MAPS, PLANS AND SKETCHES	85
XIX.	MUSIC	88
XX.	GAMES	89
XXI.	TOBACCO	91
XXII.	MEMORY AND MNEMONICS	92
XXIII.	ESPERANTO	99
XXIV.	MARRIAGE	102
XXV.	THE SIXTH SENSE	105
XXVI.	PSYCHOLOGY OF THE BLIND	116
	APPENDIX.	
XXVII.	METHODS OF ACCELERATING READING	123
XXVIII.	USEFUL ADDRESSES	157

INTRODUCTION.

Having become blind suddenly, at a comparatively advanced age (I have just entered on my sixty-second year), one of my first anxieties was to enquire what I could do to make life tolerable. To my great astonishment I failed to find any collection of references to help me. The reason is, doubtless, that the thoughts of those who are interested in the blind, "typhlophiles" as they are called, are concentrated either on the education and instruction of young people, or on organized charity to the indigent.

Another explanation of the absence of writings, such as I had wished to meet with, is that sudden and complete loss of sight is not a frequent misfortune. Adults whose vision is extinguished little by little become gradually accustomed to get along in the world more or less comfortably. Some soon resign themselves to life in a corner and lose touch of the world of the living; others, more energetic, but very few in number, assisted by the sighted, continue their former manner of life as nearly as possible.

Without going back to Homer, Huber, blind at seventeen, assisted by a faithful servant, continued the works of Réaumur on the habits of bees; Augustin Thierry, who lost his sight at thirty, did not give up historical research, but dictated his *Recits des temps mérovingiens;* Milton, blind at fifty, dictated "Paradise Lost" to his daughter; Fawcett, blind at twenty-five, with the assistance of his family exchanged his career at the bar for that of literature, was elected a Member of the House of Commons and ultimately became Postmaster-General. These and other less-known examples suffice to prove that blindness, if it seize a man in full activity, does not condemn him to idleness; and this is more particularly true when the loss of sight is so gradual that he can accommodate himself by degrees to the new situation which he has to face.

Those who are devoted to the blind learn by long experience how to save them from many embarrassments. I would contribute something towards lightening their labour.

In the following pages I shall set forth the results of my experience and researches, and I ask for the indulgence of those who already understand the subject: as blind men go I am but a *parvenu.*

The question of expense must prevent many of

my companions in misfortune from profiting by a large part of my advice. Since my work will, evidently, be read by the friends of the blind and not by the blind themselves, there is no necessity for the latter to know about all the subject matter. Each will profit by what interests himself *. I write for the blind man's family and friends; it is for them to take care that their charge be not allowed to suffer from regret at his inability to procure costly auxiliaries, such as the tandem tricycle or the phonograph.

I think I may say that it is the duty of my ophthalmic *confrères* to extract from this volume certain advice which they will find of service to their unhappy patients. I have met more than one blind person who has spoken in very bitter terms of the kind of attention which he had received in the later period of his malady.

I beseech my brethren to resist the tendency (the so-called humane tendency which I call barbarous) to allow their patients to be hopefully amused by strychnine injections, electrization, or useless internal remedies. The employment of these, even gratuitously, does nothing for the surgeon's reputation. The consolation of an

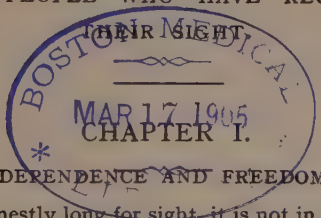
* The Author does not appear to contemplate his work being quoted in Braille, as has actually been done.—*Translator.*

incurable patient by treatment of a *placebo* nature merely prevents him arranging his life with proper foreknowledge of the fateful issue. It seems more humane gradually to prepare the patient for his lot; I wish this had been done for me. If, for instance, it is evident that he will one day be obliged to write in Braille, surely it is a duty to utilize the little sight which remains in teaching him the elements of this system.

The following pages, especially dedicated to men of the liberal professions who have just taken the "leap into the dark," would never have been written but for the misfortune which has befallen me; and it will be a great consolation to me if, as I hope, they serve to brighten the lives of others who have suffered like myself.

THE BLIND MAN'S WORLD;

ADVICE TO PEOPLE WHO HAVE RECENTLY LOST THEIR SIGHT.



CHAPTER I.

DEPENDENCE AND FREEDOM.

"If we earnestly long for sight, it is not in order to enjoy seeing faces and colours, but rather in order to escape from the thousand and one restrictions which blindness entails, out of doors, at home, at table, and from that dependence which weighs upon us even when friends are kind."

The foregoing lines are from the pen of M. Guilbeau, teacher at the *National Institution of Young Blind People*, and founder of the Valentin Haüy Museum, a man of standing by whose advice I have greatly profited.

If his estimate be true for those who, like himself, lost their sight in childhood, it is still more true for those who have enjoyed it during an already long life. One example of the difficulty encountered by the blind person in escaping from his dependence, is the constantly recurring impossibility of personally checking other people's statements; and unless he can absolutely trust those about him, life is intolerable. Never, even with the best intention, lie to a blind person. In order to do him a kindness at the moment you will have wrecked his faith and his sense of safety.

It is most irksome to have to rely on others for every trifle. "No one has ever yet understood anybody else," as Becque has remarked. Each one of us, even as regards

the most intimate friend, always has his "conscience," suggesting in his daily life little actions, possibly quite trifling, the motives of which it is none the less unpleasant to have discussed. And even if there be nothing to hide as regards self, one has a natural desire to keep other people's secrets.

At first I found it impossible to carry on my correspondence with the sighted* in a private way; I have gradually overcome this difficulty in the manner which will be mentioned in Chapter XVII.

In society, the dependence of the blind man is almost continual. He does not choose a person to speak to, but *vice versâ*. It is impossible to escape a bore or to draw near a sympathetic group, or, indeed, to leave the former in order to reach the latter.

For most purposes it is better to have paid help. A paid reader, for example, reads exactly what we want him to read, re-reads any particular passage, or leaves unfinished an uninteresting chapter. He spares his comments. If a letter is to be dictated he does not interrupt with advice. Yet, docile slave though he may be, he sometimes ends by becoming an indispensable domestic tyrant, a Cerberus, who rids himself of those who offend him. I knew a childless blind man who to the day of his death was the slave of his secretary and his cook, and enjoyed only the shred of independence left him by the mutual dislike of these two.

*"The sighted" in contrast to "the blind," a word in common use among blind people.—*Translator.*

Since the days of Antigone, some wives and daughters of blind men have been known to efface themselves entirely. However great the satisfaction to them, and however admirable it may be, such self-sacrifice is none the less unwise. The pathetic story of the English poet, whose sister was his constant companion, may be repeated for their benefit. When the sister died he was more completely disabled than when he became blind. She would have done better to marry and leave him some nephews. And the mother who sacrifices herself to the education of her daughter, is she right in neglecting her other duties ?

Such devotion should not be abused by caprice on the part of the blind man in dividing up his time. He should make it a rule to keep to the greatest possible regularity of hours. Whenever he wishes to make any alteration in this regular mode of life, he ought to make his wishes known immediately, so that every one about him may be able to make the necessary arrangements. No effort should be spared to give him the maximum of freedom and independence compatible with his condition, allowing him to do as much as possible for himself. The more self-sufficient he is, the greater will be his satisfaction in being as little as possible dependent upon others.

The blind man greatly appreciates a perfect and fastidious orderliness, so that he can find things for himself instead of asking for them. He should, as far as possible, classify his own papers, so that he may

never be at the mercy of any one particular individual when he requires to find them.

Since the loss of liberty is the worst of the consequences entailed by blindness, the first thing to be done when a person loses his sight is to make known to him all the things which he can do for himself. To give an account of these is the aim of this book.

CHAPTER II.

OTHER SENSES AS SUBSTITUTES FOR VISION.

According to a very wide-spread belief the loss of one sense leads to increased acuteness of the others. But this is not really the case. It is contrary to the theory of sensation, and to experience, to hope that a blind person, for example, may, through sheer training, learn to hear a watch ticking further away than was possible before he lost his sight.

I do not mean to say that he does not turn to account—and to good account, too—certain sensations which escape the sighted person. He learns, and indeed must learn, to pay attention to many facts which, to the sighted, are of secondary importance, or are even negligible. For instance, when my sight was perfect I might quite well fail to remark whether a visitor had gloves on; but now I never omit offering my hand to each visitor

before asking him to be seated. I know at once whether he be gloved or not; and the kind of hand, in conjunction with the voice and the height from which the latter proceeds, give one information about the sex, the height, and to a certain extent about the age and social position of the speaker. There is infinite variety in hand-shakes, and I am not at all surprised to find that a deaf mute who, in consequence of his infirmities, cannot communicate with others except by hand, can sometimes recognise a particular hand-shake after the lapse of several years. By the sense of smell I am able in a moment to take the measure of a mendicant who reeks of alcohol. Not that there is an increased acuteness of hearing, touch and smell, but rather a greater cleverness in interpreting information furnished by these senses. Those blind from birth are past-masters at this, and I should like to give my companions in recent blindness some hints culled from the experience of their predecessors.

It is almost solely by his sense of *hearing* that the blind man learns about distant objects. Unnecessary noises should therefore be reduced to a minimum, so that he may appreciate those lesser sounds which reveal what goes on around him. A window opening on to a busy paved street prevents him from hearing a person coming into the room, and from recognising who it is by the sound of the footstep or rustle of the skirt; prevents him also from listening for the clock to strike;

from understanding what is going on in other parts of the house, and so on.

It is not possible to tell with accuracy the direction from which a sound comes, but practice greatly helps in this respect. The head may be turned sideways so as to profit by the different impressions made upon the two ears, according as one or other is turned towards the source of the sound.

In order to practise the appreciation of sounds the blind man should be taken often to the theatre, and preferably to a seat near to and facing the stage. He should be kept informed of the principal movements of the performers. If seated at the side of the house he can obtain no notion of these movements. Theatre going is also an excellent training in the classification of voices according to their quality and their peculiarities.

In order to interest a blind person in a theatrical performance he should be given some idea of the piece by a preliminary analysis. Then, when the curtain rises at each act, he should have the scene described to him, and be told the names of the characters.

It is very important to cultivate the faculty of recognising a person by the voice, so as not to lose one's bearings when several people are talking.

I am told that an experienced blind man can tell from the sound of his own footfall whether the ground is dry or moist, whether he is walking near to or far from a wall, whether he is entering a large room or a small one.

For auditory information he can appeal to noises which he makes himself, for instance, the sound produced by striking the ground with a stick, or making with the lips a little dry, sharp sound like that of a kiss. I do not know to what extent adults who become blind can adopt these measures.

At any rate there is an auditory impression capable of being improved usefully and rapidly ; this impression is made by involuntarily expressed shades or slight differences in a person's voice. Being deprived of the clues given by facial expression and involuntary gesture, the blind man is all the more attentive to the intonation of the speaker, and can really profit by the art of listening, in which he should try to become expert.

The sense of *smell* is also capable of giving information about things which the blind man is unable to reach with his hands. I have never thought that there is much advantage in methodically training this sense. Blind people in whom it is keen can recognize some of the shops as they pass along a street. Smoking and snuff-taking must be relinquished if the nose is to be of real use in this way. Tobacco greatly interferes with the appreciation of odours.

Lastly, the sense of *touch*, possessed more or less by everybody, is the most valuable of all the blind man's senses. Its sphere of usefulness, but not its acuteness, can be increased by exercise.

When a sighted individual draws his fingers over Braille characters he is unable to feel the arrangement of the points, but a trained blind person recognises it immediately. This does not mean that the sighted person has a less sensitive finger, but that he does not know how to feel. The distinction is not a mere quibble. In my own case I made the mistake, from the first, of using only the right index finger in reading Braille; consequently I find it very difficult to read with the left index. Yet the sensitiveness of the right, instead of being increased, has been distinctly diminished by the friction. Again, when I have read for a long time the points feel soft and woolly to the right finger, whilst almost sharp to the left one. In spite of this superior sensitiveness, the left index finger is much more awkward in reading than the right.

The preceding paragraph was written when I had become acquainted with a little book by Herr Kunz*, in which there is an analysis of the results obtained by Herr Griesbach, a physiologist. Griesbach†, in 1900, 1901 and 1902, made a series of investigations into the sensations of the blind as compared with those of the sighted. They completely confirm the statements in

* Kunz, Director der Blindenanstalt, Illzach near Mulhouse (Alsace). "Zur Blindenphysiologie (Das Sinnenvicariat)," Vienna, Moritz Perles, 1902.

† Griesbach, Dr. Med. und Phil. "Das Sinnenvicariat oder vergleichende Messungen der Sinnenschärfe Blinden und Sehenden" *Wiener Medizinische Wochenschrift* and *Dresdener Wochenschrift für Therapie und Hygiene des Auges*, also, *Blinden-freund.*

the present chapter, and give actual figures to show the diminution of tactile sensibility in the right index finger of the blind.

A blind person, however well trained in reading, is not always able to decipher a letter of the Braille type by pressing his finger on it. In order that the points and their grouping may be easily recognised the finger has to be rubbed over them, and, for sharp perception, neither too quickly nor too slowly. One of the quite unconscious tricks of the blind reader is the attainment of the correct speed (a speed which is as great as is compatible with the recognition of the points), and the use of the minimum amount of pressure, so as to avoid fatiguing the tactile sense. This subject would make quite a good physiological investigation, complementary to the one made by myself on the physiology of reading by sight. The blind, who have to depend upon reading by hand, frequently prefer to use the less thickened skin of the left forefinger.

These observations have led me to the conclusion that, as soon as he knows the letters, the adult who wishes to train himself in Braille reading should at first read works with which he is already acquainted, or which he can have read over to him. In a single hour it is possible to read to him aloud more than he will read in Braille in a whole week. He should read fast, preferring to guess the meaning rather than diminish the speed of the finger below that which is most favourable to tactile sensibility.

In institutions for the juvenile blind it is customary to give the children many objects to handle, so that they may recognise them by touch. Nothing of this sort is of service to those who have once had sight. But, for the representation of shapes by outlines, of geographical maps, etc., there is something to be learned from special school apparatus. An excellent way of employing spare time is to practise moving the fingers over one of those relief maps which are used in the education of blind children.

Anatomical models are manufactured in Germany on the same principle, for the education of blind *masseurs :* the nerves and blood vessels are represented in relief.

The blind man's stick may well be regarded as an extension of his tactile sense organs. This " touch at a distance " is much more delicate if the stick be replaced by a light rod. The blackthorn switch, which was given me by my distinguished *confrère*, Dr. Vosy, of Choisy-le-Roi, never leaves my possession. It acts as a kind of feeler, and does away with the necessity for holding out my hands when going about. Eight inches or so from the handle a cord of similar length is attached. This cord has a button or a hook at the end which can be attached to a button-hole of the coat. With this arrangement I hardly ever have to unhook the stick except when going for a walk. It has sufficient cord to allow of its being used in the left hand without detaching it, and to prevent the rod being broken if sat upon accidentally. This did happen

to me once, when the cord was very short. When in a crowd, coming out of a theatre, or visiting in a strange house, I always walk with this stick held before me and move the ferruled point near the ground from side to side. When I take the arm of an inexperienced friend for a walk out-of-doors, especially if the friend be a lady, I feel much more comfortable if I keep the cane in my hand to feel about for obstacles. I think, also, that the use of it prevents passers by from coming near a blind man, and induces them to move out of the way. However, it appears to be the correct thing to go about without a cane, and people who have been educated in the National Institute of Paris seek to distinguish themselves from less clever blind folk by so doing.

It seems that in England eminent blind people are more practical. W. Hanks Levy* says that he has been astonished to find that the blind in France are less able to guide themselves in the street than his own countrymen. Far from despising the use of the guiding stick, he gives regulations for its use as follows :—

"The stick should be light and not elastic, in order that correct impressions may be transmitted from the objects with which it comes in contact to the hand of the user. The handle should be somewhat like a hook, and sufficiently large to be grasped firmly, so that it may not easily be knocked out of the hand ; of course the stick should be suited to the height of the

*W. Hanks Levy, F.R.G.S., Director of the Association for promoting the General Welfare of the Blind. "Blindness and the Blind; or, a Treatise of the Science of Typhlology." London : Chapman & Hall. 8vo., 1872.

individual, but it should be rather longer than would be used by an ordinary person of equal stature, and it should always have a good ferrule, that the length may not vary; the stick should usually be held in the right hand and placed horizontally about six inches in front of the person in an oblique position from the right hand to the ground. The hand should grasp the hook so as to be covered by the stick, and thus be shielded from injury when coming in contact with a post or similar object. When stepping, the stick should be waved alternately from right to left to correspond with the movements of the feet; thus when the right foot moves the stick should feel on the right side, when the left advances it should touch the left side; and as the stick should always be held about six or nine inches from the feet, the ground will always be examined before being actually trodden. When danger from coming in contact with an object is apprehended, the regular motion of the stick from right to left should cease, and it should be instantly placed before the person in an oblique position, as above named,and should only touch the ground on the right and left sides at comparatively distant periods, it being borne in mind that the use of the stick is not only to discover the nature of the ground but also to defend the walker from objects at rest. The left arm should be placed horizontally close against the chest, so as to be immediately advanced on the apprehension of danger. The pedestrian should keep in the middle of the pavement so as to avoid alike the posts on the kerb and the projections from the houses. His posture should be perfectly erect, that his face may not be injured by coming in contact with various objects."

The blind man, in short, in order to guide himself, has recourse to all the senses except sight, including at times a sixth sense, which will be discussed in Chapter XXV.

CHAPTER III.

DOMESTIC OCCUPATIONS.

Turning and carpentry are not beyond the reach of the blind. I know some who are happy and proud to make wood or cardboard boxes and to do bookbinding. These innocent amusements are dear to the hearts of people who are blind from birth. In my young days I went in for turning and other manual occupations, and would not have spirit enough to spend much time in making useless things, and making them badly. One who loses sight at a relatively advanced age possesses neither the patience nor the naïve delusions of those blind from birth, who delight in manual work, He has not time to become reconciled to that extreme slowness of execution which is characteristic of the sightless worker.

The blind man can contribute usefully to the care of the home, particularly if the family be a middle-class one. I have not space to record here all that has been written to me on this subject by M. Bonnet, of Toucy (Yonne). M. Bonnet had very bad sight, and ultimately went blind at the age of thirty-two. Few of us would care to push their skill so far as this correspondent of mine, who, for instance, fears not to light and keep up the fire, and who takes the largest share of the housework. He has adopted a blacking, easy for the

blind to use, the recipe for which he found in Madame Millet Robinet's *Maison Rustique des Dames*. His greatest pleasure is to look after little children, to be their companion when they grow up, and to take them as guides when executing commissions, which, at their age, would be beyond them.

There is nothing, however, to prevent the blind man from chopping and sawing firewood, laying fires, going to the cellar for wine, uncorking bottles, setting and cleaning the table, washing and arranging crockery, preparing vegetables, making beds, sweeping rooms and cleaning tiles. All this only requires a little practice and an appropriate turn of the wrist.

For instance, when making a bed the blind person places two chairs facing each other edge to edge. On these he puts the bedclothes. As he removes each from the bed he puts a knot in it to distinguish the top and bottom. When sweeping, he makes a clearance by carrying all the chairs to the part of the room at which he is not working.

In a country place the blind man can feed the domestic animals and look after the house, while the others are in the fields. I have heard of blind men who find great satisfaction in bottling their own wine.

It must be admitted that sometimes his domestic work is only a make-believe. However, that is always something to the good.

Domestic occupations are an excellent form of first education for children who have lost their sight at a

very early age. The mother may hand over the preparation of vegetables to such a child. In connection with this subject I would advise those who have charge of very young blind children to avoid isolating them. In spite of a certain amount of risk, more imaginary perhaps than real, they should be sent to an infant school, if there is one in the district, and even to a primary school. The absence of sight is compensated to a certain extent by freedom from distraction, and however little the teachers do out of goodwill, the children learn something, and most important of all, become interested in learning. If, besides, one seeks for a few indications in a blind school, the child can be prepared at home to profit by the instruction which is given by the special schools. From every point of view it is inadvisable that the blind child should be constantly at its mother's apron strings.

CHAPTER IV.

PROFESSIONAL PURSUITS.

I may commence this chapter by translating part of a letter sent me by the blind M. Riggenbach, Professor of Theology at the University of Bâle.

"I am convinced," writes M. Riggenbach, "that when an adult becomes blind he should, if at all possible, continue his profession, and not allow himself to be discouraged by initial difficulties. If it be imperative that he make a change, let him choose an occupation which imposes definite duties

upon him, and does not offer any opportunity for working or idling as may happen to suit his mood."

"*Indeed there is no pleasure in life for him unless he can avoid living selfishly, unless he can be certain of being a useful member of society, doing his share for the well-being of the community.*

"It is a mistake to attend only to the recreation of the blind. They should rather be encouraged to work, and to employ their whole energy. They cannot, of course, expect to obtain exactly the same situations as are open to the sighted.

"In spite of everything, the blind may have quite a pleasant and enviable lot. Personally I am quite satisfied, having been able to pursue my studies notwithstanding my infirmity, and having obtained a University chair."

There is the matter in a nutshell.

It is only fair to say that M. Riggenbach lost his sight at fifteen, and thus occupies a somewhat unusual position, for his blindness came on at the very age when a man chooses a career.

For those who become blind somewhat late in life there is no question of choosing a career. They have either to determine to try and settle down thoroughly to the former occupation, or to change their course, keeping always in mind not only their previous acquirements but also external circumstances. This advice is worthy of attention not only by those already blind, but also by those likely to become so. One of my correspondents, M. Camille Lemaire, an architect, finding that he was threatened with loss of sight, turned his attention to the history of architecture. At any rate, in this respect one has merely to leave it to the blind man's instinct. One must not make the absurd mistake of getting him to take a rest for weeks or

months just after he has become blind. On the contrary he should continue as much as possible in his accustomed sphere of life.

Another of my correspondents, M. Sommer, has followed out these indications very completely. Moreover, he has cleverly made a profit from his affliction, for at Bergedorf, near Hamburg, he started a kind of boarding house for blind people of any age, and of either sex, who have sufficient means to pay their way. In order to familiarise himself with the method of carrying on such an establishment M. Sommer commenced by spending a year at the Hamburg Institution for the Blind. Then, to increase his special knowledge as a teacher and to gain fluency in modern languages, he made a prolonged visit to England and France, before starting his establishment at Bergedorf. Some of the adventures which befell M. Sommer will be recounted in Chapter XI.

Since, in this little book, I must dwell on my own case, I may point out how far the very notion of preparing the present volume takes its place in such a programme as I have sketched. For forty years I have been interested in the physiology of the sense organs, but while working at my profession as an oculist I never allowed my practice to absorb all my attention, to the exclusion of social interests. I was a Member of the Chamber of Deputies, and belonged to many associations doing useful work. My previous occupations seemed to offer a good starting point for the

researches and inquiries of which the present volume is the outcome. Like the architect just mentioned, who, when no longer able to draw, turned to the history of his art, I considered that I might benefit others by the sum total of my attainments when I was no longer able to operate or to carry on laboratory experiments of an optical nature.

Among the members of my large family I have as much as possible portioned out those attentions with which they like to surround me, and which one would prefer not to receive from strangers. Since no one of them acts as my private secretary, I keep in my own hands the work of classification of my papers. These are done up in bundles, with the titles indicated both in the ordinary way and in embossed points.

A faithful friend, of varied talents, comes from time to time to keep me in touch with the scientific and literary trend of the times. I do not ask any of the members of my family to read what can be read by a paid servant, the daily papers for instance; nor do I expect them to accompany me on my walks. Thanks to this arrangement they can travel about and leave me for weeks or months without compunction. Their liberty and mine are equally respected.

I have mentioned that I had to give up optical research and consulting work. That is not a perfectly accurate statement. My successor at the Sorbonne, who was for a long time my assistant there, kindly visits me every now and again to tell me what is going on at the labora-

tory; and should any former patient be anxious to consult me, I call to my aid an assistant who for twelve years helped me in my private consulting work. This assistant is an excellent observer and describes the patient's condition, giving me in this way the feeling that I am still of some use as a practitioner.

Each may choose for himself between my way of working and that of a very clever blind man who had been an engineer. This individual has been exceptionally fortunate in his selection of a permanent collaborator, to whom he has imparted the difficult art of saying what he sees, and of acting as substitute. If, for instance, there is a calculation to be done, the collaborator does none of it mentally but names all the figures. The blind man can thus follow the whole operation. As intermediate between these two systems I shall quote that of M. Riggenbach.

"My duties as Professor of Theology oblige me always to have a well educated secretary to help me with my scientific study.

The post of secretary ties a man down very much. Each one usually assists me for not more than two years. This arrangement of course has its drawbacks. I have to become accustomed to a new secretary rather often, and he has to get used to my methods of work. Good nature and patience are required on both sides, but it is stimulating to work with an assistant younger than oneself, and a lasting friendship is always established between us.

My secretary generally accompanies me when at my duties."

To train up a collaborator in this way, in the certain knowledge of losing him later on, would be a terrible effort for anyone who had not the magnanimous nature of my Bâle correspondent.

As a remarkable example of the kind of thing discussed in this chapter, I must cite the case of Dr. Vosy, of Choisy-le-Roi, who continues to practise medicine in two ways, namely, as a consultant with his colleagues in the district, and as an accoucheur. Indeed, Dr. Vosy's blindness seems to be rather to his advantage in the latter respect.

I am reminded by this that in Japan the blind have a monopoly of massage. I think that if my loss of sight had been accompanied by a descent into poverty, I, a medical man, would not have hesitated to learn the details of massage. I have all the more confidence in presenting this idea to my *confrères*, because there once lived in Paris a blind *masseur*, who, though not a medical man, managed to make a living.

Nor must I forget to mention that for the last hundred years the blind have been taught basket-making, esparto manufacture, brush-making, cane-bottoming and mending of chairs. On this subject there is plenty of information to be had in every country. It goes without saying that even for the born blind these are very unremunerative employments.

A musician who has become blind, if not too old, can undoubtedly learn piano-tuning as a profession. He can keep body and soul together by this means even if he be not also an organist.

Blind teachers of the pianoforte are usually obliged to reduce their fees, because they are unable to read music along with their pupils, and are supposed to be

unable to attend properly to the fingering and the action of the hands. To this latter objection Mdlle. Barrachin, a well-known typhlophile, replies in the following terms :

"It is incorrect to say that the blind pianoforte teacher cannot notice the position of the hands.

I have plenty of written evidence upon this point, because this winter I went through a long campaign to get a blind organist appointed at Chatillon-sur-Seine. People considered that the organist should also teach, and the mothers of families opposed the selection of the blind candidate on the ground that he would be unable to exercise control over the action of the pupils' hands. I then enquired seriously into the matter, and was able to successfully repel the objection. My candidate was appointed, and all the parents are delighted with him as a teacher, and say that I did not deceive them. It is even said of him that one day, on going into a room when a young lady was playing, he remarked from the very doorway, 'Oh, how badly the child fingers.' This is explained by the fact that the position of the hands and fingers is important, not so much for æsthetic as for musical reasons."

It must not be imagined that in order to become a tuner it is necessary to have been a musician. M. Dallemagne, a farmer, at Sartrouville, a little village in the department of Seine and Oise, became suddenly blind at about twenty-five. He took counsel with M. Libey, a blind piano-tuner in the neighbouring village of Corneilles, as to the choice of an occupation. M. Libey boldly offered to teach him piano-tuning. It took weeks before the farmer could appreciate a harmony. After a year he knew how to tune a piano, and apprenticed himself to a piano manufacturer. Another year and he was able to do small repairs so well that on returning to his village he obtained customers who were willing to

pay him a higher price than an ordinary repairer. The example of M. Dallemagne, a man of unusual energy and intelligence, is the exception which proves the before-mentioned rule, that an adult who becomes blind has but a poor chance of doing much good in a profession which has nothing at all in common with his former occupation.

I have met blind men who give lessons in modern languages, generally for a very low fee. Herr Kunz* has written a little pamphlet upon the ability of blind people to teach languages.

It may be said, in a general way, that those who lose their sight well on in life are much more awkward in getting about than the blind from birth, but, on the other hand, that they are better able to do those things with which they have been familiar. Their previous knowledge of the visible world makes them quick at those very tasks which the born blind learn to perform with great difficulty. For instance, the study of French orthography is a very great stumbling block to the latter class. That they ever do learn it is due to the perseverance and concentration which is a result of freedom from distraction by the sense of sight.

It is quite easy for a blind person who is a thoroughly good speller to become a typist. To this it may be objected that most typists are stenographers. True,

*Kunz: "Ist es ratsam Blinde zu Sprachlehrern auszubilden? Wenn ja, wie kann dies geschehen?" (Berliner Congress Vortrag) 1. Mark.

but the blind typist can restrict himself to copying; an assistant, who need not be well educated, dictating the manuscript to him. He may seek employment in some large business house, where the principal dictates his correspondence to a phonograph, and distributes the records among several typists.

Helmholtz told me in 1867 that he was guided in the choice of his line of work by a kind of inventory which he made of his mathematical and musical talents, and of his knowledge of physiology and anatomy. He saw that these, when associated with the apparatus put at his disposal in the Heidelberg Laboratory, formed a rare concatenation of circumstances, and argued that if he were to devote himself to a scientific study of music and hearing, he would be enabled to make discoveries which had escaped the notice of mathematicians, physicians, physiologists and musicians, each in his own department more eminent than himself.

Similarly, the man who becomes blind late in life can pass in review all his possible acquirements, and so make a judicious choice of a new career.

CHAPTER V.

CLEANLINESS, HYGIENE AND HEALTH.

The blind can look after their personal cleanliness just as well as the sighted. If accustomed to shave himself, a blind man can continue doing so, and if he fears to cut his chin he may use an American razor.

But he must take particular care of his hands, which are used in place of eyes, and are very liable to be soiled; without knowing it, he may touch objects of doubtful cleanliness. To give but one example, some stair balusters are interrupted at each turn by so-called artistic wooden posts. These have the effect of allowing dust to accumulate on the handrail, because, owing to the posts, most people prefer not to use it. When I have to make use of a baluster rail of this kind I am careful to touch it only with the tips of my nails. Blind people naturally do not like wearing gloves. On one occasion, when travelling, I met two brothers one of whom was blind. At the first meeting I unhesitatingly recognised the latter by the fact that his hand was ungloved.

The clothes of the blind readily become soiled, indoors when at meals, out-doors by contact with walls or passers by. It is impossible to avoid walking through puddles and mud, and so getting splashed. Those who go out alone in wet weather always get more muddy than others who are accompanied, because in order to avoid bumping when getting on or off the pavement they acquire a habit of raising the foot unnecessarily high, which results in splashing when the foot is brought down. His friends must make it a duty not to allow the blind man's garments to get dirty, and a point of honour not to allow any carelessness in his attire to be one of the causes of the isolation to which he is so liable.

Although, since its introduction, I have applied the principles of antisepsis, I consider that the fashion of doing away with all hangings in living rooms is an exaggeration of hygiene. It results in an amount of resonance which does not tend to good acoustics. Deprived of sight, acute hearing is most desirable, and so I much prefer to live in a room with walls well covered.

A Braille book is more liable than an ordinary book to carry contagion. It can be read in bed, even under the bedclothes, by one who is suffering from contagious disease. The book is constantly handled in reading, and is afterwards read in the same way by others who are healthy. This is a danger, a real danger, which should be taken note of by institutions which lend books to the blind. To finish with the question of books on loan, let me say that it is inadvisable that the fingers used for reading be moistened with the tongue. The advice is hard to follow, for when a page is dusty or when the sensitiveness of the finger begins to get blunted, the touch can be improved by wetting the finger and rubbing it on a slightly rough surface.

Speaking generally, great attention should be paid to the blind person's health, because illness is particularly trying to him. But literal obedience to the drastic requirements of many hygienic authorities should not be insisted upon. They think nothing of depriving their patients of the most moderate pleasures of the table ; and the blind person's family should not sanction such exaggeration. Speaking disinterestedly, for I am

most abstemious myself, I insist that the blind man should, within reasonable limits, be allowed all the pleasures of eating, drinking, and tobacco. Should he die a little sooner for his indulgence (which I doubt), he will at least have enjoyed one of the few material pleasures which are within his reach.

Gymnastics was first taught at the Pesth Blind School in 1834. It was developed by Klein at the Vienna School. As one would expect from the sporting tendencies of the English, gymnastic training is particularly developed in their schools. The Norwood school is quite outstanding. Exercises are there carried up to a standard which is quite acrobatic.

The blind man can carry out most of the exercises which necessitate special apparatus. Along with sighted companions he can disport himself with agility on the parallel bars, the trapeze, and so on. But he always finds it an effort to go to a gymnasium and be seen in public. On the other hand I consider that it is very useful, given a sufficient amount of enthusiasm, to go in for physical exercises carried out on the floor, dumb-bells for instance. When walking or cycling are out of the question on account of bad weather, gymnastic exercise of this kind has much to recommend it. It is often regarded by the sighted as tiresome, but to the blind it should offer healthy employment in lonely hours, and act as an antidote to their very sedentary manner of life. They will never do too much gymnastics, and should be encouraged to do enough.

When he has medicine to take, especially at night, the blind man should be able to dose himself correctly. This is quite simple. For instance, I often take some calomel pills when I go to bed. Instead of having the pills made up in different doses, I get them of 1/1000 centigramme each so that I can, if I choose, take several from the same box; and in this box, indeed, there are other pills, quite different in size, and therefore unmistakeable for the calomel pills.

From time to time I suffer from insomnia, and require to take one or two spoonsful of syrup of chloral. For this purpose I always keep on the table at my bedside two little bottles, each containing one spoonful. I find it impossible to measure, unassisted, the quantity to take from a bottle, and would consider it cruel to disturb other folks' sleep by ringing the bell, just in order to be assisted to go to sleep myself.

CHAPTER VI.

THE DWELLING.

In the course of my medical practice I used to impress upon patients who were threatened with blindness the advisability of owning their houses, because a compulsory removal is almost disastrous to such people.

I find in my own case—and I do not stand alone regarding this—that any disarrangement, however slight, of my accustomed surroundings, makes me very

uncomfortable. I like to be able to lay my hands on my books and things, and to know the whereabouts of all the objects among which my life has been spent. It would be a great effort to think of them elsewhere than in the spot where I used to see them.

In the every-day life of my establishment the adage of Franklin "a place for everything, and everything in its place" is strictly observed. Anything which has been used, such as a visitor's chair, is at once put back in its place. If a stranger comes to see me I am left alone with him. I have no need of anyone to hand him a particular document, or a copy of one of my works* or to demonstrate the use of my optical instruments. Aided by one of the light canes previously described, I walk about the house without hesitation.

I have heard it stated that in a blind man's house the doors should either be shut, or opened wide. I do not believe in this. Even if it be granted that his family are very careful never to allow doors to stand ajar, one fine day a stranger makes this mistake, and the blind man, walking with his usual confidence, collides with the door and bruises his forehead. No great harm is done, perhaps, but to avoid the unpleasant experience it is better to take no precautions at all. There is no danger, provided he never advances without moving about the end of his stick in front. In fact, even without a stick, there is no danger if the head be not held forward.

* Of which a list will be found facing the Translator's Preface.

At the very beginning, I thought it would be a good idea to set up landmarks, for instance along the walls ; but with the stick in hand this is unnecessary. In a very large house it might be convenient to have carpet or linoleum pathways laid down in places. I have not found the need of it.

But, in a garden, I am lost even if I know it well. I pass a good deal of time in the country, and have followed the advice given me by my friend Dr. Chibret, to have a string stretched along a definite path. I follow the string and thus move about like a trolly car. If the ground be sandy, a pathway may be made by removing a little strip of sand. If the place were my own I would have a strip of asphalte or concrete laid down in the middle of a path, so as to form a track where I could walk boldly, and at the same time peruse some light volume in embossed points.

Since I retire to rest long after the other members of the household, I have had an electric bulb, with a switch in connection, put into my bed. This allows me to get my feet warm without disturbing anyone.

So as to be able to call assistance at any time, whether in or out of doors, I always carry a whistle in my pocket. It is an English siren with a characteristic sound.

Mr. Kenneth Scott tells me of a method of calling attention which is used by Orientals. It consists in striking the slightly hollowed palm of the left hand with three fingers of the right hand.

To lessen the sense of loneliness, most blind people enjoy the company of domestic animals.

CHAPTER VII.

MEALS.

Those who are blind from birth are nearly always dirty feeders, and put their fingers into the plate. People who become blind know, of course, how disagreeable this is to others, and will be wise to make an early resolution never to eat with their fingers.

Since the meal hour is the pleasantest in the blind man's daily round, it is most important that he learn to take his food nicely, and thus feel himself fit to dine out. I can hardly emphasise this too much.

To prevent soiling of the clothes and linen he should wear a napkin in front. A little knot is tied at one of the corners and pushed in between the collar and the neck. By this device the napkin is prevented from falling off unexpectedly, and remains in place as securely as if it were fixed by a button.

To take soup is the most difficult operation. The spoon should be tilted a little before raising it, so as to make sure it is not too full.

Certain actions are impossible, but these can be done without. Thus, I have given up attempting to put the right amount of mustard on my meat. As an offset to the difficulty which the blind person finds in doing everything without assistance, must be placed the pleasure in assisting him taken by his neighbour at the table. I have learned to allow my neighbour to do

little things for me, even when not necessary. I am quite able to help myself to whatever I require to drink, by inserting the left forefinger more or less deeply within the glass, and blind people with a good musical ear recognise the rise of liquid in the glass by the increasing pitch of the sound. But what is the use? For if the gentleman on one side enjoys cutting up my meat, or the lady on the other side wishes to look for bones in my helping of fish, why should I deprive them of such pleasure?

One of my correspondents, who does not like to mix the meat and vegetables, uses a plate with its bottom divided into two by a partition.

In the early days of my blindness, I procured an aluminium fork. The lighter the fork the more easily one appreciates the weight of the morsel picked up, which, if too heavy, can be put back on the plate and cut again. As a matter of fact I have not found it of very much use, and they tell me I eat quite nicely enough to go to a large dinner party.

The servant who accompanied me to the house has more than once been thoughtfully retained by my friends to assist in the waiting. Knowing my ways, he serves me, unbidden, with suitable helpings, and pours out my wine. No one has to pay special attention to my wants, and the conversation—to me the chief pleasure of dining out—goes on uninterruptedly.

If the person who assists me be a chance acquaintance, the result is almost the same. I ask him at the beginning

of the meal to read me the *menu*, and I tell him then what I am going to eat. Before adopting this plan, my neighbour, if inexperienced in my ways, would wait for me to ask the name of the dish, and if I happened to be in the middle of saying something, would still wait until I had finished. The result of this was delay in the service of the meal, and everybody's attention was directed to us, much to the detriment of the conversation.

If the meal hour be the blind man's pleasantest time, the reason is that he is then in the company of people who sit in definite places, and that, consequently, he can take part in general conversation without being bothered by the comings and goings of those to whom he is speaking. It is only when at table that he can be sure of not addressing someone who has just gone away, and it is only there, if he has been told beforehand of each one's place at table that he does not require to recognise by the voice the various people who join in the conversation. Let the fare be passable and the guests in good humour, and the blind man can enjoy for an hour his social life almost as well as his sighted companions.

If, for the man to whom almost every other delight is denied, it is a real pleasure to be at table in good society, the pleasure is still greater if he can enjoy it at home. Here he always feels more at ease and can choose his own guests. Batzko said that the blind man can have but two forms of happiness: to meet his friends round his own table, and to dream of com-

pensatory rewards in a better world. The former appears to me the more certain of the two, but to those who prefer the latter I recommend Batzko's book.*

CHAPTER VIII.

WATCHES AND CLOCKS.

Ever since I grew up, and that is forty years ago, I have kept in mind Franklin's maxim "Time is the stuff of which life is made." This "stuff" I have never wasted, but have used up every little clipping. And in spite of the perpetual darkness of my days when, often, it is impossible to avoid doing nothing, or to keep out of unsought conversation, I have preserved a desire to know the time; this mania of mine is my excuse for devoting a chapter to it.

Ordinary watches of the "hunter" type, but without any glass, are modified for the blind man's use by the addition of twelve little metal pins fixed around the dial, one opposite each figure. It is easy to locate the hands by the sense of touch, and to tell the time almost to a minute. The habit of holding and opening the watch with the left hand, and feeling for the time with the left thumb, should be practised from the first.

An old-fashioned turnip watch will do well enough if you are not particular about the exact time; the

* Ludwig von Batzko. "Ueber mich selbst und meine Unglucksgefährten die Blinden." Paul Gotthelf, Kummer, Leipsig, 1807.

glass can be opened and the hands felt. I like to carry a repeater as well, but there is no reason why the two methods should not be combined in one watch.

I have a great affection for a little striking travelling clock, which stands on my bed table. I wake and want to know the time, press a button, and easily go to sleep again.

A cheap luxury is a time-piece with a loud tick which can be heard all over the room. A Black Forest cuckoo clock will serve the purpose. It helps you to know where you are. Another luxury is to have a clock which chimes each quarter differently. Having lost my bearings in space I find all the more satisfaction in knowing them in time; which, for a sighted person, requires but a glance.

In my room I have two clocks. They do not keep exactly together, and so should the first strike when I am thinking of something else, though I may fail to count it, my attention is aroused, and I listen carefully for the second one to strike.

Lastly, here is a trick for finding the time at night with only an ordinary watch. Wind your watch slowly, precisely at the same hour as on the previous night, and count the clicks. Suppose there are 144 clicks, then each corresponds to ten minutes.* If you wound your watch before getting into bed and want to know the time during the night, wind it again slowly. You will have been in bed ten minutes for every click you hear.

* 24 hours=1,440 minutes.

CHAPTER IX.

WALKING IN TOWN AND COUNTRY.

The blind man must not give up walking exercise. He will enjoy it when he can walk without thinking about his steps and while talking to his companion. He should put his arm through that of his guide and walk a very little behind him. Every time the foot is to be lifted, as in getting on to a pavement, the guide raises his forearm slightly but sharply, whereupon the blind man steps up so as not to stumble, and, if necessary, uses his stick to locate the obstacle exactly. In stepping down, the guide presses his arm to his side as if he wished to prevent his charge falling into a hole.

The various people with whom the blind man walks should act uniformly, for if different signals be employed he will be bewildered. This is so very true, that those who have always been accustomed to a particular guide are apt to strongly object to a change. The moral is twofold. The family must aim at identity of method, and the blind man resolve to put up with differences in his treatment by different people. A strange guide should be instructed how to act, and then, if the instructions are not followed the blind man should just try and make the best of it.

Most blind folk like to be taken about by children, not only for economy sake, but also because a very young companion is accustomed to obey. The child,

if of a good disposition, is proud of his important post and makes it a point of honour to do his best. It is a great pleasure to me to take a walk in the country with one of my little grandchildren, and I am certain that the one who happens to have the honour of looking after his grandfather is much delighted, and perhaps profits morally as well.

In town I prefer the arm of an old retainer who retires discreetly if I meet a friend, or make a business call, until the conversation or business is finished.

There should be no attempt on the part of the guide to conceal the blind man's infirmity. Blind people used to wear a placard, and I remember seeing in the London streets a man walking with a dog in front of him. This intelligent beast always kept a strain on his leash. The blind man, with the leash in one hand and a stick in the other, kept constantly striking the walls of the houses at each step, and cried "Blind! Blind! Blind!" Everyone gave him a wide berth, and thus he travelled the most crowded streets of the city. Most people do the very reverse of this and prefer their infirmity to pass unnoticed. This *amour propre* when carried to an extreme is dangerous, but all the same it should be respected. I have come to the conclusion that if the guide finds it useful upon occasion to warn passers by, he should do it in such a way that it is not observed by his charge.

Like Dr. Sommer, I always wear dark spectacles. They conceal the unpleasant stare of the blind man, and

are useful in attracting the attention of the passers by. No one thinks of taking offence if my guide, by gesture or speech, attempts to make my passage as easy as possible, or even, unknown to me, asks a traveller, for instance in the Metropolitan, to vacate his seat.

In Paris, and probably in most towns, the pavements slope towards the gutter. This gradient, though less than the corresponding slope of the roadway, is quite easily perceived by the blind pedestrian. After a short apprenticeship, and provided he does not walk too quickly, it gives him warning of his approach to crossings. I prefer to wear rather thin soled boots or shoes, because they make it easier to recognise small inequalities of the road.

Whether a gutter contains water, or not, may be ascertained by listening to the sound made by shaking the stick in it.

Those who become blind in youth have other sources of information, such as the resonance of their footfall, and they may perhaps possess the sense of obstacles discussed in Chapter XXV.

An experienced guide is able to lead his charge without accident along the busiest streets. Should it be necessary to move out of the way to let someone pass, he walks slightly faster and turns sideways. The blind person, warned by this manœuvre, falls behind the guide, and so avoids being jostled by the inattentive passer. In a crowd, coming out of the theatre for instance, and more particularly if the guide be inex-

perienced, it will be well to walk immediately behind the latter, placing both hands on his shoulders.

Sometimes the guide, unknown to his charge, signs to a person passing to make way. On the other hand, when the road is wide and little frequented this constant attention is unnecessary, and the two can walk side by side without arm guidance. The guide's footfall and conversation, or the slightest contact are enough for the blind man to steer by. The latter, indeed, likes to act as independently as possible. He hates to be dragged or pushed like a log, and this is undoubtedly one of the reasons why most blind people dislike walking with anyone to whom they are not accustomed.

If there is a stair to climb the guide lets go, and places the blind man's hand on the hand rail. The latter, carrying the hand well forward, can tell with certainty when he is coming to a landing. This is obvious, but why, like many other things, has it never been spoken of before ?

When walking along narrow paths, across fields, through woods, and especially on the hill side, the blind man, always keeping his stick in hand, should be in communication with his guide by another horizontally held stick. With practice this becomes such a sure means of communication that long and tiresome climbs are possible, with a guide in front. Every one to his taste, of course !

Even horse exercise amuses some. It is unnecessary to say that they do not select frisky mounts, and I only

know of one, Dr. Armitage, who had a nasty riding accident.

Few of those whose affliction has come on them suddenly and late in life dare to go about alone either in town or country. With those blind from birth it is different. Among others, Joseph Birrer, a Swiss, was a hawker who went from village to village. Again, and quite recently, a blind man who lived in the Rue des Petits Carreaux, a densely populated part of Paris, took long walks by himself. He always carried cigars and sweets, and offered these to the men or children who came to his rescue. Always armed with a stick and an umbrella the least shower of rain was an excuse for opening the latter, as by means of it he conveniently obtained information as to the propinquity of buildings.

Blind folk, whether in town or country, go about alone more easily by night than by day, because sounds are fewer and less confusing, and so help very materially in their guidance. I have heard tell of a man who never went out at night without a lantern, in case of being run over by a cyclist.

A blind person, whether experienced or not, if he lose his way can always take a cab home, or to a friend's house, but I do not think it is wise to trust to an unknown driver without taking his number in the presence of a third party.

For those who lose their sight gradually it is of the utmost importance to continue going about alone, in

spite of the dread of their relations. They thus learn to substitute, little by little, for the information given by sight that kind of information which I have been discussing in this chapter. As the blindness increases they shorten their walks. Those, on the other hand, who become suddenly blind and yet wish to go out alone as much as they can, will commence with little strolls round about the house, and be kept under observation from it until they acquire sufficient confidence.

In my own case I practise crossing the street where I live, so as to be able to go to the post with any pressing correspondence late at night after the others have retired.

CHAPTER X.

THE TANDEM TRICYCLE.

When I lost my sight one of my first thoughts was to find some form of physical exercise sufficiently arduous to suit my temperament. I do not take kindly to a sedentary life. Being a fairly good bicyclist I thought first of a tandem bicycle. It would have done very well if I could always have had an experienced cyclist at my beck and call. But as this was impossible I consulted M. Pierre Giffard, the well-known editor of *Le Vélo*, and, after discarding the tandem bicycle

and the "sociable" (on which two people sit side by side), we decided upon the tandem tricycle.

After riding a machine of this kind for a few weeks I wrote M. Giffard a letter, which he published in *Le Vélo*. The following are the principal passages in it:

"The blind require exercise more than the sighted. Even the most sedentary person makes little movements all day long, without actually being aware of them. He rises to look for something, turns round to look at a speaker, stoops for an article he has dropped, and so on. The blind man, on the contrary, though able to employ himself moves about much less.

They say I should go in for gymnastics at home. It is good advice, but wearisome to follow. Try using dumb-bells, alone, and with your eyes shut, and tell me how you like it. After five minutes you will have lost all patience and yet will hardly be the least warm. But to get heated is the aim of physical exercise. To get really warmed up the larger masses of muscle must be employed, hence the best sports are those which bring into special play the muscles of the thighs and legs. This has been confirmed by the studies of my colleague Lucas-Championnière.

Cycling is better than walking. The blind man occupies the rear seat of the tricycle and gets exercise without preoccupation of mind, even though he may have no great confidence in the leader. When on foot a certain amount of attention is required in stepping on and off the pavements. When crossing streets he has to hurry, to slow down, or to stop as the guide bids him. This does not happen when on the tandem-tricycle, for he almost automatically adopts the pace of the person in front. If a sudden stop is to be made the leader sounds the horn and back-pedals, or puts on the brake, and the blind rider back-pedals almost at once. On account of the stability of the tricycle, which can be brought to a standstill, it is possible to ride even in the busiest thoroughfares.

Thanks to your advice I have adopted, even for my town travelling, this method of transport which I find at once healthful, cheap and rapid.

It is worth noting that one gets less bespattered with mud

than on a bicycle, and a mud guard on the front wheel is all that is necessary. Since exercise in the open air is good for me, I have chosen a route which can be travelled even if there is a little mud.

The adoption of an unvarying itinerary may be poor fun for the guide, but I, at any rate, enjoy being able to determine exactly where I am at any minute. I readily recognise the curve at the fountain of *La Place François Premier*, and the down grade onwards to the *Avenue Montaigne*. The sound of the traffic tells me when I am crossing *La Rue Pierre-Charron*, and I know by the sound the wheels make the instant we enter the *Avenue de l'Alma*, etc.

If you want more details, come and get them for yourself. Take the front seat of my cycle and lunch with me in the country some Sunday. We can discuss the whole subject *en route*. I make just one stipulation ; the first mile or two must be ridden in silence, for you are too accustomed to ride on two wheels to succeed at once in managing three without accident. I know these first attempts ! Mounted on a tricycle even the most skilful bicyclists begin by running straight into the gutter.

DR. J. . . ."

After nearly three years' practice I can say that the tricycle has been more satisfactory than I could have hoped. At first I found it exceedingly unpleasant to be at the mercy of a guide in the busiest and noisiest parts of the town. It took a good deal of determination to get rid of this sensation of dread. After all, there is no more danger than in a cab, which may be drawn by a vicious horse and driven by a drunken cabby. I have also become accustomed to the rolling motion which is always felt on a tricycle, no matter how slight may be the tilting of one or other side wheel by inequalities of the road.

The tricycle has other defects besides this rolling

motion. Chief of these is the difficulty of applying a back brake to it. If it be made to act on the wheels its action is irregular, and, owing to the differential, it cannot be applied to the axle.

The chief fear one has, therefore, is that the chain may snap in a rapid ride down-hill. The remedy is to become reconciled to going down-hill slowly, so that if the chain does break the leader can stop the machine either by the brake, or, with greater certainty, by using the foot on the tyre.

Still another inconvenience of the tricycle is that little accidents are more common than with the bicycle, because, since the wheels run in three tracks instead of one, the chances of running over a nail are multiplied by three.

My first machine, bought second-hand, had unequal wheels, the front one being larger than the other two. I do not know whether there is any advantage in this or not. Probably there is, for I found it in the only other tandem tricycle which I have had occasion to examine. But there is one certain advantage in having equal wheels where repairs are concerned, namely that on a long journey only one spare tyre need be carried.

I ride now a machine built by the "La Française" Company. Its specification is as follows :—

Machine as short as possible (2 metres 10 cm. = 6 ft. 10 ins.). Extra strong double barred frame, height 55 cm. (22 ins.). Wheels very strong, steel rims, diameter 65 cm. (25½ ins.). Pneumatics 42 mm. (1⅝ in.),

continuous air chamber. Brake on front wheel with ordinary brake lever. The machine weighs 32 kilogrammes (70½ lbs.). The cranks are strongly bent, which keeps the feet out of the line of mud, but does not present the same inconveniences in a tricycle as in a bicycle.

This machine, which I have in daily use, gives me perfect satisfaction. It runs exactly 5 metres for each revolution of the pedals, not a high gear, certainly, but high enough for safety. By counting every alternate revolution of one pedal and multiplying by 10 the distance run can be calculated. At the foot of a hill it is well to ask the leader to estimate its length so as to know, as one goes along, how much more effort is required. Since the gear is equivalent to 5 metres for each pedal revolution he can easily check his estimates and will soon be able to make them fairly exact.

The back wheels are at such distance from each other that the machine can pass through a door 80 cm. (2 ft. 7½ ins.) broad. This, in town, avoids the necessity of opening the carriage gates. In the country I prefer my old machine which gives less oscillation, its wheels being 25 cm. (10 inches) farther apart than in the other. There is no reason why the frame should not be built to carry a lady either in front or behind.

If the tricycle is insufficiently strong the frame may begin to yield. Should this happen the machine has a tendency to deviate to right or left. However slight the defect, it must be put right immediately, or the frame becomes more and more strained, and then at

an inopportune moment the front wheel buckles—an accident which may be dangerous when it is remembered that the blind man inevitably loses his presence of mind in a case of accident. The idea of cycling for the blind is not a new one. At Norwood, where they are particularly strong on cycling, they have a kind of twelve-seated cycle train, only the first and last seats being occupied by sighted persons.

I know that in France there are at least three blind men who have used the tandem tricycle for a long time. One lives near Saint Nazaire, another at Melun, and the third at Brienne-le-Château.

CHAPTER XI.

TRAVELLING.

Many blind people have a passion for travel. Some, in order to meet those whose society and converse are congenial, others, like M. Guilbeau on his mountaineering expedition, merely to enjoy the sounds of nature.

Some travel far afield to make a living by giving concerts, or by tuning pianos. Naegeli's little book* gives an account of the adventures of Jacob Birrer, the blind hawker, who travelled with his wares from one

* Naegeli. Sonderbare Errinerungen und merkwüridge Lebensfahrten des Jacob Birrer. Lucerne, 1840.

village to another in all kinds of weather. Blind people from all parts of Europe are met with at every International Congress of typhlophiles.

The blind traveller usually goes to the station in a cab, and puts himself and his luggage into the hands of a porter. One man of my acquaintance, when about to stay in a town he did not know, used to write and tell the stationmaster when to expect him, and ask to be met on the platform and conducted to the hotel omnibus.

BOSTON MEDICAL LIBRARY MAR 17 1905

On the journey it seems unwise to seek help from travelling companions, unless, as often happens when travelling third class, they offer it of their own accord. The only service which one need ask is to be put in charge of a railway porter, who, for a small pecuniary consideration, will generally do all that is necessary. In this way M. Hauptvogel travelled from Leipzig to Paris by slow trains without failing to change at the various junctions. This changing is the chief difficulty in railway travelling.

M. Mahaud also, teacher at the National Blind Institution, travels alone all over France.

There are various hotels where blind people are welcomed, *e.g.*, in Paris, the boarding-house at 4, Rue Bertrand, quite near the Institution, and in London the pension of Miss Blott, 30, St. Charles Square, North Kensington.

On arrival at an hotel the traveller should find some pretext for giving liberal tips to those of the servants

whose assistance he will probably require. By doing so he will, for instance, obtain whatever he wants at table without being dependent on chance neighbours.

A blind man of my acquaintance is passionately fond of travelling, but likes to seem as little as possible inconvenienced by his infirmity. Therefore he has made quite a number of clever observations, of which the following is one. When getting into a country trap with two steps, he knows that if he is getting up on the near side he must begin with the right foot on the lowest step, or he will be in a difficulty. In a little book about the Vienna Blind Institution, Klein * speaks of having procured for his first scholar a compass which is easily read by touch. I am informed that compasses of this kind are sold by the British and Foreign Blind Association. The information may be useful to blind travellers.

I am under no illusion as to the usefulness of this chapter, for I have known of but a few people who, losing their sight late, have had the courage to overmaster the fear of their relatives, and to travel alone. M. Sommer, of Bergedorf, near Hamburg, already mentioned in this volume, wrote me in the following terms :

" I hold that travelling alone tends greatly to increase the blind man's self reliance and so to make him independent. I have myself made the following trips without any companion.

From Hamburg I went to Harwich by the English boat. For

* Bibliothèque du laboratoire d'ophtalmologie à la Sorbonne (Volume A. v. 12).

a consideration, the steward attended to me, and at Harwich saw me into the London train with my luggage. In London I was met by a lady who recognised me by the photo I had sent her. As a guide I employed a boy of twelve. I prefer children of this age; they are very useful when honest and well brought up. I attended to my own linen, to the arrangement of my clothes, and so on, and packed and unpacked my luggage. Only for reading did I require help. My letters came in Braille and I replied in typewriting. . . . . .

After a month's stay, I left London for Havre, via Southampton, where a railway employé took charge of me and saw me on board with my luggage. I placed myself under the steward's care. Twelve hours later I was in Havre, but the gentleman who ought to have met me was not on the quay. I went through the Customs formalities and was driven to the boarding house where I had engaged rooms through an advertisement. . .

I stayed six months and embarked for Hamburg in December. The steamer was German, the sea rough. On the boat I was able to find my way about without assistance, because, before becoming blind, I had crossed to South America on a similar vessel belonging to the same company. I got the steward to cut up my food for me. It was very stormy, and we lost one of the propeller blades; this made us late in arriving at Hamburg and there was no one to meet me. The steamer did not berth at the jetty, but remained out in the middle of the Elbe. All the officers, including the doctor, went on shore as soon as possible, and left me alone at about eight o'clock on a freezing winter night. I had to trust myself to a complete stranger in order to get ashore and pass the Custom House with my many packages. We went ashore, he and I and the luggage, on a little steamer which took us to the Custom House. From there I took a cab with my luggage to an address at which I had arranged to put up. Unfortunately the wrong number had been given me, and I had to hunt along the street for my lodgings. I found the place eventually.

Though adventures of this kind are unpleasant at the time, it is a pleasure afterwards to remember how you came through them alone. They give you self-reliance to an extent hardly possible otherwise."

My friend Monnier, of Geneva, also writes me that he travels alone from time to time, but prefers to have a companion. Yet, should his companion fail him at any moment, he is independent.

A very shrewd blind man has pointed out to me that the money saved in travelling alone is sufficient to pay liberally for many little attentions.

CHAPTER XII.

RELATIONS WITH THE WORLD OUTSIDE.

It is a difficult thing for the blind man to make new friends. Moreover, the friendship of people he has never been able to see seldom ripens into intimacy, unless there happens to be someone in the family gifted with sufficient powers of observation and description to present him with an actual likeness of the new-comer.

The blind man ought therefore to strive to maintain his former acquaintanceships, for every one lost is vexatious. I do not go now to the meetings of those Societies which I used to attend regularly year after year—the Physical and Biological Societies, for instance —because their membership is more or less changed; yet I continue to attend the meetings of the Academy of Medicine just as of old.

The blind man, indeed, is dependent on the conversation of those who choose to address him, and he remains

isolated, even more dolefully than in the quietest corner of his own house, if he goes to a meeting of people who have no very particular interest in him.

It is wrong to suppose that he is a centre of interest to others. On the contrary, they flee from him as of no use. Over and over again my guide has told me of the passing of former friends, and without even a handshake. Each is so busy, and goes his way without so much as a word to me. A person who speaks to a blind man, especially if only a casual acquaintance, is afraid of being buttonholed. That kind of friend passes out of the blind man's life entirely.

But it is often our own fault. In a small company, if an individual speak to us we are rather prone to look upon him as a god-send, and stick to him. This is a blunder, for he is thereby prevented from going round to talk to his friends, and of course doesn't care to be caught a second time. So he keeps clear of the blind man on the next occasion. I have learned to my cost that it is better to take the initiative, and to ask the person who has so kindly spoken to me to introduce me presently to someone else. This he is always pleased to do.

In spite of the difficulty of it, the blind man should do his very best to make new friends, or some day, when the old ones are gone, he will be left alone. Everything possible should be done in this direction by his family; what is possible for the born-blind is surely possible for him.

Some people are under the delusion that they will hurt a blind man's feelings by talking about things *visible*. On the contrary, it is the height of enjoyment to hear even trifling incidents described.

It happens also that either through a mistaken kind of reserve, or through timidity, people hesitate to speak. They are afraid to bore us, afraid to begin conversation and afraid to continue it. They refrain from conversation because they do not sufficiently realise that a blind man should be addressed exactly as if there were nothing the matter.

When you meet a blind person you are disconcerted by many little things. You are disappointed when, instead of taking the proffered hand, he answers your friendly remarks with "Who is speaking to me?"

There are thus many reasons why most blind folk prefer to stay at home and content themselves with the society of the home circle, and of the few staunch friends who visit them. However admirable such home-life may be, it is depressing to the spirits.

It is the duty of his family to take their charge into society and to tell him the names of those present. He can then to some extent take the initiative and invite people to come and talk to him who would not come uninvited, never dreaming that the blind man, wrapped in his darkness, would welcome with delight their little efforts at entertainment.

Not to know the moment when the person he is talking to goes away, is one of the most trying things

the blind man has to put up with in society. It is all right if he never goes unaccompanied, for in that case he is duly kept informed; but it is a hard task for the companion. In a drawing-room, should someone introduce himself by name—which is not often—he never thinks, on meeting the blind person a little later on, that it is necessary to mention the name a second time. Whenever I can manage it, I find a seat on a sofa, so that if an acquaintance sit down beside me for a chat he cannot get away without my knowing it, for between my finger and thumb I quietly and lightly hold on to a little bit of his coat-tail.

It requires considerable tact, on the part of the companion, to give clues to his charge in such a natural manner that they pass unnoticed by others, or to fill up gaps in the conversation skilfully, so that he is kept informed of what is taking place, and thus enabled to avoid speaking or referring to a person who has just left, or, what is worse, speaking to the empty air.

All things considered, unless he be accompanied by a very devoted, self-denying companion, the blind man will be wise to avoid large gatherings.

CHAPTER XIII.

READING ALOUD.

To be read to is always one of the greatest of the blind man's resources. But how very inferior it is to reading for one's self.

Given a good reader, there is considerable enjoyment to be obtained from literary works. But, oh! that daily paper! To read aloud even a most moderate-sized newspaper takes from one-and-a-half to two hours. Try it, and see what a time it takes just to read one whole page. You will hardly believe your eyes when you look at the clock. Even a poorly educated person, indeed, does not really read a quarter of the newspaper, he only skims it, and what he does read he goes over with a rapidity that is quite unattainable in speech.

The balance of speed in favour of mental reading, over reading aloud, is simply astonishing. To follow the reading of a newspaper from the beginning to the end is at the best a pleasure to the unfortunate blind pensioners of the Quinze-Vingts * who, like a class at school, listen to the reading of a paper (at present *Le Rappel*) which they select by annual plebiscite.

The ideal is reached if one who knows the tastes and the affairs of the blind person first of all reads over the paper himself, marking everything of interest. And yet, the reading aloud of the marked passages can never be as good as sight reading, which always varies in speed according to the degree of attention merited by the subject matter.

But, although the blind man's friends may most willingly give him an intelligent account of what is in the newspaper, they are at a loss with the special

* A Blind Asylum in Paris.

magazines—particularly those in foreign languages. I have had to deny myself almost entirely the pleasure of following the progress of ophthalmology, because it took whole days to read to me what I could have skimmed over for myself in our special reviews in a few minutes every day.

I prefer a hired reader to a friend or a member of the family, because I like to be able to skip, without ceremony, certain paragraphs or chapters, and to repeat important passages. But the hired reader must be honest, and not, as sometimes happens, skip whole pages of a book which he finds tiresome.

People of our rank do not like to be interrupted when reading, in order that we may take notes either in ordinary writing or in Braille. They become impatient if stopped for this purpose, and, on the other hand, they say we are not attending if we write while they read. Reading aloud to a blind man is no pleasure.

I got my first reader to read to me "The Art of Reading" (*L'art de la Lecture*, by Legouvé), but hardly had she mastered its principles, of which the most important is an exaggerated attention to punctuation marks, when I had to get another reader. I had not the energy to begin this kind of education all over again, and now I put up with one who only reads moderately well.

With very rare exceptions people do not pay enough attention to stops when reading aloud. Should one get the chance of the services of a reader who will remain

for some time, it would be well worth while to educate him in this respect. It is necessary to insist, at first, on a prolonged stop after each sentence. It is a good rest for the reader, and enables the listener to retain more or less of what he has heard. If the reader fail to make a long pause at the full stop, each sentence seems to obliterate the one before from the listener's memory. Moreover, the pauses are unconsciously employed by the reader in mentally grasping the following sentence, so that the result is a much improved intonation.

It is also important, and difficult enough too, to make the reader announce typographical variations as they occur: question marks, parentheses, changes of type and so on. When reading a letter the writer's name should be mentioned first of all. If a footnote occur the reader should say "footnote begins," and "footnote ends."

An inexperienced reader is very apt to omit the titles of chapters, or the numbering of paragraphs.

It is most enjoyable to be read to while walking about the garden, because under such conditions mental recreation and physical exercise are combined. It is a pleasure to move about freely beside the reader, whose voice is a constant guide. But it is not so pleasant for the reader!

I know some blind people who combine reader and secretary in one individual, who comes at fixed times. Personally, I very much prefer to employ someone

upon whom I can call at any minute, and who, should a visitor come in, returns to her needlework or other occupation.

During the holiday time I get my numerous little grandchildren to read plays to me, distributing the parts among them, and so by friendly rivalry training them in the art of reading aloud. I would fain hope that later on they will remember with a kind thought the pleasure they gave to their grandfather. This kind of armchair theatre has been a splendid recreation for me.

CHAPTER XIV.

WRITING BY HAND.

The question of writing is not by any means such a difficult one for the adult who becomes blind as for those blind from birth. The latter can hardly learn ordinary writing, while, on the other hand, one who is well accustomed to write may continue to do so in the ordinary way, and without much difficulty, in spite of loss of sight. Although the point writing of which Barbier (almost a century ago) was the inventor, and Braille the Amerigo Vespucci, is almost the only writing employed in Blind Institutions, it occupies, in my opinion, but a secondary place among the methods of recording thought possessed by him who is blinded relatively late.

Anyone can realize the truth of this by writing a few words with the eyes closed. I have a letter from M. Renaud, Chief Clerk at the Finance Office, in which he says, "I want to tell you about the very practical use of cards—visiting cards—for writing short pencil notes, even in bed. The card is held in the left hand with the forefinger under it. This gives sufficient resistance for the pencil, and at the same time allows of its lightest pressure being felt through the card, so that the writing does not tend to get mixed up. It is even possible to write on both sides of the card by following the simple plan of turning down one of the corners on the written side, so as to avoid confusion."

This seems to be a good way of leaving a short written message with the servant when making a call.

The difficulty of avoiding confusion is increased when a large number of lines is to be written. A well-enough known plan is to fold the paper into pleats, to begin with. The first pleat is made about a centimetre ($\frac{3}{8}$ in.) from the edge of the paper. Without removing this, a second pleat is made in the reverse direction about a centimetre lower down, and so on until the whole sheet is folded into a packet, like a closed fan. The first line is written on the top of the packet, and the latter is gradually unfolded as the successive strips are written upon.

This folded paper method is inconvenient when much writing is to be done, and so a number of inventors have contrived writing boards for the blind, of more or less

useful design. I have had one made which is quite satisfactory; the present volume, among other things, was written with it. It was described with explanatory drawings in *La Nature* (18th May, 1901), and can be obtained from Giroux, 19, Rue de l'Odéon, Paris. It is not patented, and may be made anywhere. This board, which is a trifle clumsy, does away with the necessity for a table. The writer sits, preferably in a low chair, with the board on his right knee.

I may repeat the words with which I presented it at the Academy of Medicine on 23rd April, 1901:

"Last year, having recently lost my eyesight, I sought an apparatus by means of which I might write in the usual way. Many methods were brought to my notice. I tried several of them, but none were satisfactory. None of them allowed free play to the hands and fingers. Any method whatever in which the hand is guided is objectionable, because it slows or deforms the writing, and at the same time takes up so much of the writer's attention that freedom of thought is interfered with.

I then got constructed this *Writing Board for Blind People** upon which I now write in your presence. It is made in

* French "Planchette Scotographique." The latter word is derived from the Greek "Skotos" darkness, and "Grapho" I write. *Translator.*

accordance with the principles of the physiology of writing, which I have expounded elsewhere.* The chief characteristic of this little apparatus is a kind of grip for the writer's elbow. Working in a horizontal plane round a pivot † the forearm causes the point of the pen to write along an arc of long radius, and this arc of a circle is represented in the line of writing. If the paper is of moderate breadth the lines of writing have only a slightly noticeable curve, hardly more than seen in many ordinary handwritings.

Another important part of my instrument is a rack and pinion by means of which the paper is moved up a centimetre every time the writer proceeds from one line to the next.

Lastly, I use, as you observe, one of those convenient fountain pens which we get from America. I think it is much better to write in ink than in pencil, for the blind writer finds it very difficult to know the condition of the point of a pencil, in order to turn it round between his fingers to avoid flattening it at one part. If a pencil becomes flattened without the writer's knowledge, the writing becomes so thick that it may be undecipherable.

But the pen may, by chance, not write at first, and I have had the aggravating experience of thinking that I had covered a page, when in reality I had not written a single word.

To get over this difficulty I make use of a narrow strip of unglazed paper, like that used in copying letters. To know if the pen is working, I have only to draw a line across the strip. If there has been ink at the point of the pen it wets the paper, which tears easily at this part. I will do the experiment in front of you without fear of failure. You see the paper has torn with very little effort on my part, and I conclude from this that the pen is working correctly.

If you wish to get an idea of the use of my board, you have

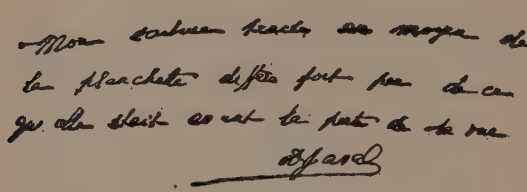
* Le mécanisme de l'écriture. *Revue scientifique*, 21 mai, 1881. Vol. XXVII., p. 647.

Sur l'écriture. *Société de biologie*. 24 novembre, 1883 (distinction entre les mouvements isochrones du poignet et les mouvements des doigts).

Essai sur la physiologie de l'écriture, brochure de 32 pages. Alcide Picard et Kaan.

† *i.e.*, the elbow resting in the grip. *Translator.*

only to glance over the manuscript of the present communication. For fear of illegibility I write a little more slowly than formerly, and if I may believe my friends the result is really fairly good."



When I have to write a letter elsewhere than at home, I go about it in the same sort of way. Putting my right elbow on the table, and making up my mind not to move it, I then place the paper so that its left border coincides exactly with the edge of the table. At the conclusion of each line I slide the paper along the edge of the table, so moving it further from the fixed point at the elbow. With a little practice the left hand learns to move the paper by an almost constant amount every time. The paper may be held by the first four digits, while the little finger occupies the angle between the top of the paper and the edge of the table. As each line is written the little finger is moved up about a centimetre, and then by the other four digits the sheet is pushed up until it strikes the little finger. This method of writing necessarily results in less regular spacing of lines than when the writing board is used, and requires a little more dexterity.

Should one desire to write in pencil, the "Koh-i-Noor" pencil will be found to be hard, and yet to give a black

writing. It is marked "British Graphite Drawing Pencil, compressed lead, made by L. & C. Hardmuth, in Austria."

CHAPTER XV.

THE TYPEWRITER AND THE PHONOGRAPH.

Blind people whose handwriting formerly was bad should perhaps use a typewriter. The younger the individual the sounder is the advice, for youth shortens the apprenticeship to the instrument, and also offers a probability of many years' profitable use of it.

It is better to learn the whole key board by heart than to fix Braille letters on the keys. This will be simplified if a Braille copy be made of the order of the letters on the keyboard.

I have several times advised persons threatened with blindness to practise typewriting. Those who acted on this advice the most readily were people with sight still good enough to recognise the large letters on the keys of the machine, though not to make out their own handwriting.

I do not think the literary man should follow this advice, for although the use of the typewriter can be acquired at any age, that is not to say that it will quickly become such an unconscious and automatic

action as writing. Now, the satisfaction obtainable through the employment of a typewriter is proportionate to the acquirement of this automatism, because unless he be familiar with Braille, the blind man, in contrast to the sighted, is unable to use the machine for writing from a rough draft. Nor can he make any erasures, and so is forced to construct the whole of each sentence before commencing to write it. A blind man employed at the office of the *Petit Méridionel*, at Montpellier, receives telephonic news and transcribes it with the typewriter. The typewritten sheets are then sent to the printer.

Machines have been made which turn out writing legible by both blind and sighted, but as yet they are not perfected. With such a machine a person would be able, although ignorant of Braille himself, to write a private letter in Braille to a blind correspondent.

For blind and sighted alike the phonograph gives the most rapid means of recording thought. But it has certain drawbacks. It can hardly be used except at home on account of its large size ; the records are short, barely three minutes in the ordinary model ; the price of an ordinary instrument is high enough, but for a special model with half-hour records, it is excessive.

In many American business houses the principal dictates correspondence to the phonograph, and the records are then handed to typists. There is nothing to prevent a blind literary or business man using the phonograph in this way.

I find the instrument useful for drawing up the plan of a work. Bit by bit I make it repeat, as my composition advances.

Lastly, since the cylinder records are of uniform size, it is possible to correspond with a friend who has a phonograph, exchanging records by post.

The gramophone, recently invented, seems to be much superior to the phonograph.

CHAPTER XVI.

BRAILLE READING AND WRITING.

In the special schools, writing in points, known by the name of Braille writing, is the corner stone of education. When an adult loses his sight the first advice which he receives from teachers of the blind is to go and learn Braille. That the advice is good there can be no doubt, but the blind man's friends perhaps attach undue importance to it.

Braille reading is a resource during hours of solitude, and, when sleepless, a book printed in relief is a capital bedfellow. The spot where one leaves off reading may be marked by fixing to the edge of the page one of the little spring clips sold by stationers. Another way is to mark the line with an embossed point.

If among the blind man's acquaintances there be anyone anxious to learn how to read Braille writing,

he will do well to do so from the other side of the page, that is from right to left. Reading thus becomes identical with writing.

Braille reading, valuable as it is to the born blind, is but a make-shift on account of its excessive slowness. Very few of the blind can read aloud from Braille text with sufficient rapidity to make the hearing of it tolerable.

On account of this slowness all my educated correspondents, except those who went blind very young, are unanimous in making as little use as possible of writing, and especially of reading in embossed points. To give but one example, here is an extract from a letter written by M. Riggenbach.

"I learnt Braille reading and writing almost immediately after losing my sight, but have made very little use of these accomplishments. Reading and writing in embossed points require too much time and are too wearisome to be often used when one can be read to, and can dictate one's writing. *I became blind at fifteen,* and so had not learned to write with the ease and rapidity of the adult. So I have done without writing for twenty-six years. A few months ago I obtained a typewriter..."

The slowness of Braille reading is especially tiresome when, reading for pleasure, one only wants to glance over or skim the book. This slowness arises from the fact that the fingers can only touch a single letter at a time, while the sighted reader can take in, on an average, two letters at each horizontal movement of the eyes along the printed lines. Reading by touch is

therefore, for physiological reasons, twice as slow as reading by the eye.*

To all this it may be objected that in every language there is some system of contracted Braille. Speaking only of the French system, the gain in speed is about one quarter. As to reading, experience proves that there is no gain at all.

At the end of last century Mr. Hall, an American, brought out an excellent Braille typewriter. Three keys on each side are worked with three fingers of each hand. I suppose that with this machine the writing speed is the same for complex as for single point letters and figures. Drawbacks to the use of the Hall typewriter are its high price (125 francs, or over £5), its weight of several kilograms (1 kilogram = $2\frac{1}{5}$th lbs.), and the noise. Doubtless these will become less as the machine is improved, but I do not think it will ever oust the pocket Braille frame.

With the Hall machine, or any other like it, writing is at least three times as fast as with the style. For

* Those who are interested in questions of this kind can refer to my articles on the physiology of reading which appeared in the *Annales d'oculistique*, 1878 and 1879, to my articles on the hygiene of reading in the *Bulletin de la Société de médicine publique*, 1878, and in the *Comptes rendus de la Société de biologie*, 1878 and 1879, to my article on books and shortsight, *Revue Scientifique*, 22nd November, 1879, and *Revue d'hygiène*, 1880; to my article on the evolution of printing in its relation to the hygiene of vision, *Revue Scientifique*, 25th June, 1881, and *Revue d'hygiène*, 1881. See also Lamare. "Les mouvements des yeux pendant la lecture" (from my laboratory) *Comptes rendus de la Société Française d'ophtalmologie*, 1898, *p.* 354.

All these articles are reproduced in a volume at present in the press, to be published by Felix Alcan, Paris.

arithmetical work Taylor's apparatus, the calculator slate of M. Schleussner, of Nuremberg, the National Institution's cubarithm, or, finally, the Hall machine may be used. In default of a cubarithm one may, after writing the figures in points, turn over the leaf in order to touch the figures, while writing, as one goes along, the results of the calculation on the other side. On this subject I may refer the reader to Barazer's book.*

An adult, when away from home, may make good use of Braille for taking short notes of information received in the course of conversation. I should not like to do without the aluminium Braille frame which I carry in my pocket.

The model of this frame, which is sold at the Institution, is, unfortunately, made for more expert fingers than mine; and the inconvenience of this is more marked than it would otherwise be, because I use the frame almost solely for noting down names and numbers. Accordingly, I had one made of the same size, but with only six lines in place of nine, and with sixteen letters to the line instead of twenty-three.

Braille also serves me for marking documents which are to be preserved, and the stout paper envelopes in which they are classified. At the various institutions for the blind they keep a special paper of different degrees of thickness, and moderate in price; but it is much more

*_Le commandant Barazer._ "Conseils aux personnes qui perdent la vue," 8vo., Dunod, Paris, 1887.

economical to use paper which has already been written on, such as that of which account books are made, which is of excellent quality. Blind people of course cannot take cognisance of ordinary writing on the paper, but it must not be used in communications between them and the sighted. Ordinary paper is sufficiently tough for documents which are not to be preserved, or sent by post. For books, on the contrary, even with very thick paper, some of the embossed points may get flattened down by use, or by undue pressure.

It would take too long to describe how to learn Braille. I will not spend time over it because there is plenty of information to be got on the subject, and there is no difficulty in learning it without a master from the manuals already published. Specially to be recommended are Captain Mouchard's, which can be obtained at the Valentin Haüy Association, and also, obtainable at the same place, my own manual compiled to facilitate the study of French contracted Braille.

When commencing to learn Braille as much time as possible must be devoted to it. It is best, at the very first, to do nothing else, at the risk of its becoming a night-mare. Numerous spells should be taken every day, no one of them so long as to exceed the limit of sustained attention, or to blunt unduly the tactile sense. The two forefingers are to be used side by side and moved simultaneously. Reading and writing should be done alternately, a ways keeping in mind the table of Braille signs. Working in this way I

think that any person, in spite of a poor memory which does not improve with age, should learn Braille in a few weeks well enough to read and write with profit. Those who find great difficulty in recognising letters of the usual size may, to begin with, use a frame with large cut rectangles; for instance, the model called the Prague model, which is sold by the Vienna National Institution. Frames with extra large rectangles are obtainable at the British and Foreign Blind Association in London.

For those who find it difficult to remember the form of the ten signs which constitute the *standard line* of Braille, his original standard line is figured here. The signs in this line are arranged in a logical order, the key to which is obvious. By suppressing five of these signs, without changing the order of the remaining ten, Braille formed the standard line which is understood by all blind people.

Upon the whole, the younger and the more left to himself the blind man is, the greater the necessity for his learning Braille, because there is a considerable number of books in all civilised countries, especially in the important circulating library organised for France by the Valentin-Haüy Association, and these afford him a considerable range of reading, both for education and amusement. Many blind people subscribe to the journal *Le Louis Braille* which is published for their use.

It is unfortunate that most books, and notably the *Revue Braille*, are printed in the contracted form, and that in different countries there are variations in the notation, so that but few are able to read in a foreign language. It is agreed on all hands that the ordinary writing must be mastered before contracted Braille is attempted. Each one can then decide for himself whether he will launch out into this complementary study.

Before studying the rapidity of blind reading and writing, it will be interesting to obtain an approximate idea of the rapidity with which man is able to record his thoughts by the various methods at his disposal. It is to be understood that I am at one with the typists in recognising that whole words only are to be taken into consideration. Thus " l'homme " counts one word. For writing or typewriting it is understood that the writer must employ capitals, accents, and punctuation marks. The same holds for Braille.

It ought not to be difficult to collect some statistics on the rapidity of that mental reading which is of such real importance to educated people. Considerable individual variations will be discovered. In the absence of precise figures we may say that it is easily possible to read five hundred words per minute *without missing anything*.

We have more definite information about the rapidity of speech. According to information obtained at the Stenographic Institute (150, Boulevard Saint-Germain,

Paris), the slowest speaker pronounces more than one hundred words per minute, and the most rapid rarely more than two hundred. A fair average appears to be one hundred and sixty words per minute.

A skilled typist easily writes forty words per minute for hours at a stretch. The record, made at the 1900 Exhibition, is sixty-seven. Typewriting is therefore almost four times slower than reading aloud. I estimate the rapidity of a perfectly legible hand-writing at twenty, or about one-half that of ordinary typewriting. A very rapid handwriting, where accents and the dots of the *i*'s are omitted, while the punctuation is retained, may reach thirty-five words per minute and be quite legible by the writer. My number is twenty-five with the writing board.

Trained telegraph clerks transmit, in Morse, twenty-five five-letter words per minute, but they do not put in the capitals or accented letters. Their speed is thus comparable with that of ordinary writing. The receiving clerk, who reads the message by the ear, is therefore easily able to write it out as it comes. All telegraphists say that they could accurately interpret telegrams by the ear even if the speed of arrival were very much greater. The speed of Morse is limited entirely by the dexterity of the transmitting clerk.

As early as 1856, shortly after Morse brought out his invention, M. Charles Bourseul, a high official in the French telegraph service, was struck with the idea that the Morse alphabet might be employed by the blind,

preferably according to the Braille method. He therefore made an instrument similar to the Morse machine, but without clockwork, by which the Morse alphabet could be written in relief. In accordance with the improvements in telegraphy, it would be simple to make an analogous apparatus in which the signs would be replaced by two lines of perforated points, by means of which one could aurally read the ribbons obtained by the writing apparatus.*

Let us pass on to the consideration of Braille. Of all the methods of writing this is the slowest, especially for those who begin late in life. Even the most proficient of the blind can hardly write more than eight words per minute when using contractions; and with some sacrifice of legibility due to defective placing of the points (especially when using the grooved frame) ten words at the most may be accomplished.

For reading, the slowness of Braille is still more marked. I can now manage to read twenty words, many born blind read sixty, a few one hundred, and one or two can read one hundred and twenty words per minute. M. Deménieux, the Librarian of the Valentin-Haüy Association has read aloud to me very nearly two hundred words per minute. At the moment when his right forefinger reaches the end of a line, the left has already passed over about half the following line, so

* *Instituteur des Aveugles* (Journal de Guadet), vol. 2, p.140. Appréciation de Ballu sur l'appareil de Bourseul, *Ibid.*, p. 162.

that almost always mental reading by the left hand is a variable amount in advance of actual reading by the right hand, and this in turn probably more or less precedes the spoken word. M. Demenieux and his colleagues declare that most readers find contracted Braille slower than uncontracted. The fact that a few are able to read rapidly should not cause us to forget the foregoing statistics, according to which reading is a slow process even to those blind from birth. That the latter are satisfied with it only means that they have never experienced the pleasure of ordinary sight reading.

What has just been said applies to French. It is evident that in German even fewer words per minute can be read or written, without, perhaps, any actual inferiority in speed, because a German compound word is equivalent to several French words.

English is probably the most rapid. When *stop* stands for *arrêtez*, *bus* for *omnibus*, and *go on* for *continuez*, there is a good chance of getting through a lot of words in a short time. Thus the typewriting record at the Chicago Exhibition was ninety-seven per minute. According to a remarkable communication by Mr. Edmund B. Huey * one individual, in reading English, was able to read more than eight hundred words per minute mentally, and three hundred and sixty aloud.

In short, if particularly skilled professionals be left out of count, the writing of the born blind is three

*American Journal of Psychology, vols. XI. and XII.

times, and their mental reading at least five times slower than in the case of the sighted. The adult who becomes blind can hardly hope, as regards reading, to do even as well as this. For him the slowness of Braille is the more vexatious because formerly he was accustomed to read quickly, and, indeed, to take his words, sentences, and even whole pages in giant strides.

Historical Account.—Those who wish a detailed account of the history of writing in raised characters should read the two volumes in which M. Pagnerre has recently dealt with it. The manuscript with which M. Pagnerre has enriched the Braille Library is in contracted Braille, and is dated 1902.

In the supplement to the volume published after the meeting (held at Brussels in 1902), of the International Congress for the Amelioration of the Condition of the Blind, there is a résumé of Pagnerre's work.*

In 1820 Prony presented to the Académie des Sciences an account of a writing system invented by Captain Barbier †. So early as this Barbier pointed out the superiority, for the blind, of a writing formed of embossed points. He wrote by means of a pricker or style which was guided, as is still the case to-day, by the outline of a rectangular cell. Underneath the paper was a grooved plate the use of which is still continued, at any rate in France.

*Read also an important article by M. Guilbeau, Valentin-Haüy, 1895, put into embossed writing in *l'Anneé Linguistique*, Librairie Klinksieck, Paris, 1902.

† Communication by Cuvier and Molard on a *Mémoir de Charles Barbier*, a brochure in 18mo. of 24 pages. To be seen at the Braille Library, 31, Avenue de Breteuil, list number 118. This brochure refers to the reports made in 1820 by M. de Prony, and in 1823 by M. Lacépède.

Barbier : *Notice sur les salles d'asile, le retour à la simplicité primitive de la théorie alphabétique, l'instruction familière des enfants du premier âge, des aveugles de naissance et des sourds-muets.* Brochure in 8vo, printed by Bachelier, published by Hachette at the Elementary Classical Library, Paris, 1834. Can be seen at the Braille Library and at the Library of the Institute in a volume *Mélanges de statistique, No.* 259.

Three years later M. Ampère and M. Lacépède made another report to the Institute. Barbier had introduced two blind persons who could read by his system. Astonished at such a success the Directors made one of the blind men leave the room, and dictated a sentence to the other. On returning to the room, the former, without any hesitation, read the sentence which his comrade had just pricked out. Thus point writing, and the method of doing it exactly, are the work of Barbier, who also arranged the grooved plate in such a way that the blind writer could remove it at once in order to make a correction. Braille has given him full credit for his work, and ends the preface to one of his books in the following words: "We are never tired of repeating our indebtedness to M. Barbier, who was the first to invent for blind people the method of point writing."*

In the course of the twenty or twenty-five years which he devoted to the perfecting of writing in relief, Barbier seems from time to time to have modified the arrangements of the points, before adopting the rectangular cell capable of taking in six points.

In a brochure which can be seen at the Braille Library, Catalogue Number 110F., will be found a detailed explanation of the manufacture of Barbier's writing tablets for the use of blind persons.† I will content myself with showing one of his embossed notations, according to a table and a volume belonging to the collection of M. Boissicat, Manager of the Paris National Institute. The impression in relief is perfect, and, as will be seen, according to this system an unlettered person can learn to read in a few hours. The corner stone of the system is the following printed table, which has to be learnt by heart, line by line. This effort of memory, the only effort demanded by Barbier, is singularly facilitated by the logical and deductive tabular arrangement of the speech sounds, which recall those of the celebrated Conen de Prépéan, the father of French stenography.

---

* *Procédé pour écrire au moyen de points.* 2nd edition, Printed at the Royal Institute of young Blind Persons, Paris, 1837. (Private collection of M. Boissicat.)

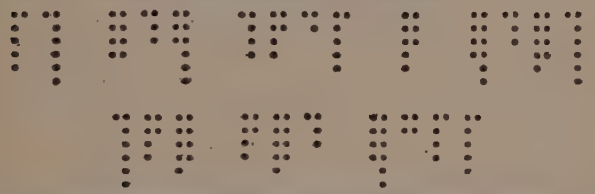
† *Annales de l'Industrie Nationale et Étrangère ou Mercure technologique*, Bachelier, 55, quai des Augustins, Paris, 1822.

CHARLES BARBIER'S TABLE OF SPEECH SOUNDS.

1st line.	a	i	o	u	é	è
2nd line.	an	in	on	un	eu	ou
3rd line.	b	d	g	j	v	z
4th line.	p	t	q	ch	f	s
5th line.	l	m	n	r	gn	ll (mouillé).
6th line.	oi	oin	ian	ien	ion	ieu

To the blind man's touch each sign is composed of two rows of points, placed vertically and parallel. The number of points in the left hand row indicates in which horizontal line, and that in the right hand row in which vertical line of the printed table, the speech sound is to be found.

Here is the very example given by Barbier :—



If the reader has applied himself to it, he will have reconstructed the eight words of Barbier's sentence.

Lè choz util n sorè ètr tro sinpl. (*Les choses utiles ne sauraient être trop simples*).

This arrangement is manifestly unfavourable to rapid reading, and, if my information is correct, Barbier was the first to try our present-day cell, which has only six points.

To Louis Braille, student, and afterwards teacher at the Paris Institute, is correctly attributed the selection of the combinations of those six points which form our alphabet.

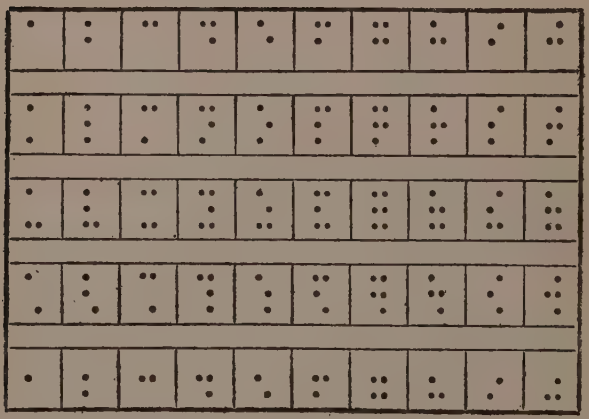
In my opinion the selection was not as happy as it might have been. Braille only received the quite rudimentary education which in his day the State gave to the blind. With most unusual ingenuity and extraordinary patience he produced his system of writing and musical notation. But, having only his own brain to draw upon, it could not occur to him to take the requirements of foreign languages into account, or to leave the

door open for abbreviations. "These various methods of abbreviation," says M. Moldenhawer, "were thought out in various countries without any regard to other languages."*

And so it is to the adoption of orthography by Braille that we must impute the distressing state of international relations among the blind; for the slowness of the Braille alphabet was the Tower of Babel which brought about confusion, due to each nation having its own abridgment. I know but few blind people who are able to read more than one language in contracted Braille.

Here is Braille's Point-Table. It will be seen that the second, third and fourth lines are derived, by the addition of one or of two points, from the first, which we shall designate the *Standard Line.*

THE BRAILLE POINT-TABLE.



And here, arranged in exactly the same order, are the printed (or written) ordinary characters represented by the preceding table. It is the table *in print* corresponding to the table *in points.*

* *Compte rendu du congrès de Bruxelles, p.* 162. For further details, see Dr. Javal's new book mentioned in the footnote p. 69.

THE BRAILLE TABLE IN ORDINARY PRINT.

1st line.	a	b	c	d	e	f	g	h	i	j
2nd line.	k	l	m	n	o	p	q	r	s	t
3rd line.	u	v	x	y	z	ç	é	à	è	ù
4th line.	â	ê	î	ô	û	ë	ï	ü	œ	w
5th line.	,	;	:	.	?	!	()	"	*	„

By putting ten signs in his first or *Standard Line* Braille was enabled to employ the whole of this line to express the ten numerals.

The study of Braille is facilitated by the fact that the pupil has only to learn by heart the form of the ten first point-signs, and the order of the fifty characters in the printed table. This is an appreciable advantage for those who, like myself, have to learn it late in life; but for the majority of the blind it is dearly bought at the price of its inconvenience, as I shall now show.

If a sighted reader cover the lower half of a printed line he can go on reading without difficulty, but if he cover the upper half he can no longer do so. The eye of the reader runs along the tops of the letters, which are much more characteristic than the bottoms. This I have elsewhere pointed out. In the same way, when I am reading in embossed points my finger does not touch the bottoms of the letters so distinctly as the tops, and I may thus happen to read *c* instead of *m* or *x*. This means that the most sensitive surface of my finger is smaller than the height of ordinary point writing.* I do not suppose I am alone in this. Indeed I think that the inconvenience is so generally experienced that it has had something to do with the introduction of *New York point*, in which the letters are only two points high, though sometimes three points broad.

The regular Braille table only comprises fifty out of the sixty-three combinations which are possible with the rectangular cell.

* After much experiment the height of the characters adopted in France is 5 millimetres. In Belgium the ordinary height is only 4 millimetres, and reading does not appear to be any slower.

Braille orthography* gained ground through the influence of Drs. Guillé and Pignier, directors of the Institution; and also through that of Guadet, a teacher there, who acts as a link between the Parisian and the foreign schools by means of his journal *L'Instituteur des aveugles*. I do not think that they acted wisely in abandoning the phonographic system of Barbier.

Sometime in the first half of the nineteenth century Klein, an Austrian of great ability, but without any knowledge of the work of Barbier or of Braille, invented a point alphabet legible by both blind and sighted. Klein's characters were five points high and were slow to read and especially slow to write.

The *trait-point* of Dr. Vezien and the ingenious alphabet of Dr. Mascaro are forms of embossed writing which are easy for the blind to write and for the sighted to read.

In England, Austria and Denmark the grooves of Barbier have been replaced by little cups. The use of these necessitates a very upright position of the style and consequent correct formation of the points.

Barbier thought of the grooving on account of economy in the cost of manufacture. No such reason for its employment exists now, and I recommend the beginner to use the frame with cup-shaped depressions from the very first. By so doing, even though later on he reject this type of frame, he is sure of learning the important habit of holding the style quite perpendicularly to the paper.

CHAPTER XVII.

CORRESPONDENCE WITH THE SIGHTED.

Two questions occur in this connection: how to write in privacy; and, how best to learn the contents of a letter received, considering the necessity of choosing someone to read it.

* *i.e.*, Uncontracted Braille. *Translator.*

Regarding the first question, the reader has already learned that from the commencement of my blindness I got over the difficulty with my writing board. The typewriter may be employed, and, for regular correspondents, even Braille. In the latter case a table of the point alphabet must be sent to them. The Valentin-Haüy Association furnishes, gratuitously, sheets with the Braille characters printed, and directions for their use.

Postage stamps should be kept in a box with compartments for the various values; each compartment recognisable by a mark.

In sending Braille writing by post, use as few stamps as possible, in order to avoid flattening down of the points by the post office obliteration, and be particular to fold the pages of the letter carefully. No one need know the address upon the letter. The writer can post it himself when he goes out with his guide, or better still, may learn to go alone to the nearest letter box.

Incoming letters are more difficult to deal with. It took me two years to learn, accidentally, that the blind man should always open his own correspondence. Before doing so he may be told whether there is anything on the outside to show where it comes from, *e.g.*, the name of a commercial firm, or a post mark. I once got a letter with a few words in Braille on the envelope, which in a convenient manner informed me that the contents were not private. The very feeling of it often gives information about a letter. A begging

letter on poor paper can hardly be confused with one from a lady ; the cream laid envelope, possibly scented, or bearing an embossed monogram, is surely characteristic. Indeed, outside marks of this kind may be agreed upon by people who correspond regularly.

On opening it, precise information as to the nature of a letter may sometimes be obtained by touch. A printed prospectus has a different feeling from a visiting card, and a cheque can hardly be confused with a begging letter.

If the blind person is in doubt, as indeed he usually is, he puts the letter back into its envelope until he finds a suitable individual to read it to him. When I have perused a letter I always prick out upon it a clue wherewith to find it later on, and the name of the person who is to re-read it to me when the time comes for replying.

I am acquainted with one blind man who occasionally has a letter addressed to him at the *poste restante*. After obtaining it he hires a cab and goes to a distant café, where he gets the waiter to read it to him. Since the waiter does not know him, it is hardly possible that he can give away the secret to the blind man's friends.

Again, although Braille correspondence can be posted as printed matter in an open envelope, the blind man may get it sent under cover at the letter rate, should his household happen to understand Braille.

Lastly, if the blind individual and his correspondent know any one foreign language, the correspondent may

write in this language, taking care to make all the words quite legible. In this way I receive letters in German, and ask my correspondents to use Roman characters. If, in addition, though it is not by any means essential, *u* is replaced by *ou* and *ie* by *î*, etc., any French person can read my letter to me in a perfectly intelligible way; all that is necessary is that he should not understand German.

CHAPTER XVIII.

GEOGRAPHICAL MAPS, PLANS AND SKETCHES.

To make a rough sketch in points the writing frame may be used, or better, special frames with square and equidistant openings. Or one may employ the little wheel with which patterns in the fashion papers are cut out, and, to overcome the inconvenience of a reversed sketch the points in relief can be felt from the under side.

In blind schools embossed maps have been long in use for teaching geography. They are easily enough interpreted by the variations in the embossing of the outlines of boundaries, rivers, etc.

M. Kunz, Director of the Illzach School, near Mulhouse, has spent more than twenty years in making a collection of maps in relief for the use of the blind (*see* page 157, "Useful Addresses"), and he is always

adding to it. At Illzach these maps can even be made to order. A unique specimen may be made of embroidery on canvas, or on the perforated Bristol board made for the Frœbel Schools and obtainable in the shops.

Embossed maps with the details filled in make difficult reading for those who have not practised from childhood, and of course they seldom fulfil special requirements. Only a few of the blind are subscribers to a German review, published in contracted Braille, which has its articles on the Spanish-American and Chino-Japanese Wars illustrated with relief maps of the battle-fields, ports and towns. Still less are we likely to meet with a ready-made plan of the town, district or house in which a particular blind person resides.

To meet such requirements the firm of Carrière, 22, Rue Saint Sulpice, Paris, has very successfully made for me sheets of wax a little more than a millimetre (1-25th in.) thick, and measuring 20 centimetres by 30 (1 in. = approximately 2½ centimetres). These sheets are transparent, and it is quite easy to reproduce any map or plan, of special interest to the blind person, by placing the waxen sheet over it, laying flexible threads along the outlines, and pressing them down into the wax with the fingers.

The most convenient threads for the purpose are made of lead. They cost very little, are perfectly flexible, and soft enough to be easily broken off with

the fingers at any desired length. In order that different kinds of outline may be distinguished from one another the lead threads are used in three degrees of thickness, between one and two millimetres. One-millimetre threads are easily legible by touch.

To increase still further the variety of the lines, guitar strings (the 6th and 7th), which are supple and at the same time rough, may be used; they are made of silk wrapped with metal thread. String and pieces of wooden or wax matches may also be employed. Points may be marked with grains of shot, glass beads or drawing pins.

Since wax is very flexible these maps should be fixed with drawing pins on to thin light sheets of wood, for preservation. The same sheet of wax can be used several times by removing the embedded threads and smoothing down the surface of the wax with the thumb-nail.

I find no difficulty in preparing plans for myself on these sheets. A notched centimetre rule, a square, and compasses may be used for the purpose.

At Brussels, in 1902, M. Carl Schleussner, Superintendent of the Nuremberg Blind Institution, exhibited cotton threads coated with wax which he uses in teaching geography. A sample which he kindly sent me seemed perfectly adapted to the purpose of making raised outlines on a map, but, unfortunately, after a few months the threads became so dry that they lost their power of sticking to the paper.

One day I went on the tricycle to ask M. Dallemagne, at Sartrouville, for the information given in Chapter IV. I asked him to direct me how to go from his house to St. Cloud. He gave me the information at once by tracing out the direction upon my person. Touching me with his finger all the time, he travelled down one of my legs and so indicated the road quite distinctly. Being far from my home, and my waxed sheets, this little manœuvre was most serviceable.

CHAPTER XIX.

MUSIC.

Happy are the blind with an ear for music. It is the only art within their reach, and out of it they get more pleasure than do most sighted people. Happier still are those who in former times could play some instrument, for their memories are stored with a selection of masterpieces.

Those who used to read music easily are to be pitied, because Braille music notation, when the music is in several lines, can only be read slowly, and only one hand is free for playing. It requires the patience of a person blind from birth to learn a pianoforte piece almost bar by bar, playing alternately with each hand and running the other over the music signs. I fear that no adult musician who had lost his sight would

ever have sufficient patience for it. Braille music writing, which originated in the notation of J. J. Rousseau, is at present in use at the Galin-Pâris-Chevé School. It is a most remarkable system, for it is simpler and occupies no more space than ordinary written music. It is not particularly expensive to reproduce.

If sufficiently gifted the musician will find that much pleasure can be obtained from improvisation. With the assistance of a sighted person, or perhaps only aided by a phonograph or gramophone, he will be able to learn pieces by heart, but, except in quite exceptional circumstances I doubt if he will profit at all by learning the Braille notation. I think he will be wise to make up his mind to leave the use of this excellent method to those who are blind from birth. Be that as it may, most Institutions, and especially the Paris Institution, have very distinguished teachers of music whose advice should be of great service to those who wish to study.

CHAPTER XX.

GAMES.

If only he have a decent memory the blind person is able to play dominoes, chess, draughts, or cards. If his memory be specially good there is no difficulty at all. Good chess players do not see the board, the

opponent has charge of it and makes the alternate moves. Having myself a vile memory I am not able even to play dominoes. I can recollect neither those already out nor those in hand. I have not attempted to play draughts or chess because I am quite unable to recollect the arrangement of the pieces on the board.

The last-mentioned games can easily be played by most blind people, using draught and chess boards in which each square is bored with a hole to receive a peg which is fixed to the bottom of the pieces. Sets of this kind are made for railway travelling and can be bought in the shops. It is a simple matter to mark the black and white pieces so as to make them recognisable by touch. For those who do not like the hole and peg system there are special boards in which the squares of one colour are more sunk than those of the other. In the Berlin Municipal Blind School, besides chess and draughts, loto, halma, etc., find a place.

M. Boyer, Director of the Free School for the Blind, 39, Rue de Lille, Dijon, has brought out an easily-played hop-scotch game (German *mühle*).

The blind draught or chess player must necessarily keep feeling about with his hands in order to realise the position of the pieces, and it is therefore advisable that the opponent should have a second board for himself.

Playing cards are made in which almost invisible needle punctures denote the various cards; the blind are thus enabled to play with the sighted; or, ordinary

cards may be pricked out by means of a little instrument obtainable from the National Institution.

Without modifying the games in any way the blind are able to play solitaire, ring puzzle and bagatelle.

CHAPTER XXI.

TOBACCO.

One might suppose that the blind, not being able to see the smoke, would find no satisfaction in tobacco. But it is not so. I know of many who smoke cigarettes, though blind from birth; and of others, blinded in adult life, to whom the pipe or cigar is still the almost necessary complement of a meal. The blind, more than the sighted perhaps, are apt to pull at a cigar which has gone out without at once noticing it. I do not smoke either pipe or cigarette myself, but if I suspect that my cigar is out I put my hand round the end, without touching the cigar; if alight, the heat is easily felt.

In lighting up I make use of a fusee, which is much more convenient than a match, the flame of which is sometimes difficult to get into contact with the end of the cigar.

Here and there about my room I have trays for cigar ash, so that the ash does not get scattered about. When not in my own room, I sometimes use for this purpose

one of those spittoon flasks which are designed for the consumptive. With this in my pocket I can always get rid of ash, or of the cigar end, without inconvenience to anyone. Shut up in a bottle a cigar end goes out without any bad odour.

The most practical advice for blind smokers is to choose very dry cigars, which alone can be smoked slowly without going out. My cigar often helps me to learn the time when the presence of a visitor precludes my feeling for it on my watch.

CHAPTER XXII.

MEMORY AND MNEMONICS.

I remember meeting, when I was young, some quite illiterate peasants whose memories seemed to me to be extraordinary. They could call to mind the character of the seasons, year by year. They knew the exact dates of the most trivial events in their lives, and could remember exactly the amounts of their income and expenditure.

The impossibility of putting anything in writing, and the long monotonous hours of daily toil, in which the mind was free to ruminate, resulted in past events becoming encrusted in their brains. And these, it seems to me, are the very conditions likely to give origin to

such phenomenal feats of memory as astonished their better-educated neighbours.

The difficulty of taking notes, and the still greater difficulty of consulting them, long hours of solitude, and absence of distraction by worldly sights, are analogous conditions to which a certain number of the born-blind owe their excellent memories. It must not be forgotten, however, that those whose memories are naturally defective fail to emerge from the deep and pitiable mass with which I have had no occasion to come into contact.

Memory is essential for many of the blind man's daily actions. He must have more or less conscious memory to put his hand on the door handle without hesitation, to give his guide instructions, to know the places occupied by others at the dinner table. Some exercise their memories methodically and know, for instance, the number of paces in any particular bit of road, the number of steps in a staircase, and so on.

In order to write in ink, as I am doing now, without being able to make corrections, each sentence must be constructed entire before beginning to write. In order to make the composition consecutive without harking back on what has already been written, what has been written must be kept in mind.

Instead of merely running through the various documents which he requires to use, the blind writer must get them up thoroughly before he begins writing; the worse his memory the more wearisome is the

task, and the more his work loses in accuracy and verve. This book necessarily bears the mark of such difficulties.

The feebleness of my memory compelled me to pay special attention to those measures which must be taken by people who become blind, and have fixed hours for everything in their daily life, in order to extricate themselves from the difficulties entailed by personal work.

Embossed writing is here most valuable. The pocket writing frame enables me to put a brief note on letters received, on the large post-demy envelopes in which documents relating to the same subject are placed together, and on the margin of the larger cases in which these envelopes are classified. By some such method as this it is easy to find for oneself all papers which have been collected together, and to get those required for consultation read aloud by another person. By strict attention to orderliness, in fact, and assisted by Braille writing, the deficiencies of the worst memory can be considerably discounted.

For those who have become blind in late life, when the memory, especially for recent events, is becoming progressively feebler, any attempt to improve it is bound to prove chimerical and illusory. In such cases, therefore, there is all the more reason for adopting a valuable system of mnemonics which has been of great service to me since I lost my sight.

I was present at several lectures, about the year 1862,

in which the extraordinary individual who called himself Aimé-Pâris, described the rules of his system of mnemonics.

Here is the important table which gives the key to the system. Those who do not understand Braille may omit the first line.

1st line.	⠁	⠃	⠉	⠙	⠑	⠋	⠛	⠓	⠊	⠚
2nd line.	1	2	3	4	5	6	7	8	9	0
3rd line.	te	ne	me	re	le	che	que	fe	pe	se
4th line.	de	gne				je	gue	ve	be	ze

The first line contains figures in Braille, the second the same figures in Arabic. The use of the third and fourth lines will become obvious as we go along.

The principle of the method consists in replacing a group of figures which one wishes to remember (line 2) by a group of speech sounds (line 3 or 4) forming some word which can be recalled to mind. The word is remembered instead of the number, and in order to recall the word it must, according to Aimé-Pâris, be linked by some bizarre sentence to the event whose date is required. This method is as useful for telephone numbers, etc., as for historical dates.

Example: To recall the date of the founding of Rome I have only to remember the word *colline* (hill), the word being mentally linked to the fact that Rome was built on seven hills. The word *colline* contains the speech sounds *que*, *le*, *ne*, which in the foregoing table occupy respectively places 7, 5, and 2. So that 752 is the date of the founding of Rome.

Again, if I want to remember when spectacles were invented, I bear in mind that they were invented for the old, that is for *nos papas* (our papas). The speech sounds here are *ne pe pe*, which, by the table, give 299.

I know, however, that spectacles were not invented so long ago, and so the date is 1299, the first figure being useless in making the mnemonic.

By a mnemonic we can also remember, in their order, the ten primary speech sounds of the system. Anyone can make up for himself some sentence, which will be all the better remembered if it is more or less fantastic. In my own case, I imagine that I have gone to look for my dog which has been impounded for not wearing a muzzle on the street. Having found him, I tap him on the nose and say,

tu	*n'as*	*mis*	*rien*	*là*	*chien*	*qui*	*fus*	*pincé.*	
1	2	3	4	5	6	7	8	9	0

(You've nothing on your nose, you, doggy, who got nabbed.)
Translator.

Such a sentence is, of course, ridiculous, and the more ridiculous you make it the better you remember it. After all, this system of mnemonics is no queerer than that sometimes made use of in France to remember the names of the sub-prefectures, or in Germany to learn the multiplication table. In the chapter on "Stenography," you will hear of my proposal to employ the same ten speech sounds, in the same order, to form

the *standard line* of stenographic writing, the signs being in Braille and retaining their numerical meaning.

In mnemonics, as in stenography, the soft consonants are classed along with the hard : *de* originates from *te*, *je* from *che*, *gue* from *que*, *ve* from *fe*, *be* from *pe*, and *ze* from *se*. And, as in stenography, the mute consonants are discarded. As an example of these two rules, suppose one wish to remember the number 741, any of the following words will serve, viz., *carte*, *garder*, *carder*, *carton*, *cordon*, *Corton*, *écourter*, *encroûté*, *garde*, *grade*, *agrandi*, etc. So that the selection is very large.

As a last example I might give the simple enough formulæ of Aimé-Pâris for learning the perpetual calendar by heart, but I will only quote that for the year which may be current.

Commencing with Sunday, the days of the week are denominated by numbers 0, 1, 2, 3, 4, 5, 6 ; and the months are given the following numbers, viz., January 0, February 3, March 3, April 6, May 1, June 4, July 6, August 2, September 5, October 0, November 3, and December 5.

Suppose, to begin with, that the year commences on Sunday. The foregoing figures indicate the days of the week on which the different months commence. For instance, the figure 3 attached to the month of February indicates that the 1st of February is a Tuesday. The figure 0 attached to the month of October means that

October, like January, begins on a Sunday. It is not difficult to remember all the figures attached to the months. If necessary a mnemonic may be employed. For instance, one may remember : *

Février *trois* (le mois le plus *étroit*).
February 3 (the shortest month).

Mars *trois* (même chiffre que pour février, ce qui est évident puisque le mois de février est exactement de 4 semaines).
March 3 (February and March always begin on the same day of the week because February has exactly four weeks).

Avril *six* (mois ou l'on fait des *scies*).
April 6 (The month of the April fool).

Mai *un* (c'est de ce mois qu'à la campagne on plante à la porte du maire un mât qui porte le nom de mai et qui est droit comme le chiffre 1).
May 1 (In country places this is the month in which a maypole is erected in front of the Mayor's door. This pole is straight, like the figure 1).

Juin *quatre*.
June 4 (June has four letters).

Juillet *six* (il fait bon d'être ass*is* sous les arbres).
July 6 (it is pleasant to sit under the trees).

Août *deux* (il est *doux* d'être à *deux*).
August 2 (two's company, this month).

Septembre *cinq* (mois des chasseurs assass*ins*).
September 5 (the sportsman's month).

Octobre *zéro* (forme de la premiere lettre du mot Octobre).
October O (the first letter is O).

Novembre *trois* (le vin nouveau subit l'oc*troi*).
November 3 (new wine pays octroi duty).

Decembre *cinq* (Noël tombe le vingt-*cinq*).
December 5 (Christmas falls on the twenty-fifth).

* Of course this particular mnemonic is only of use in French. A translation is given merely in order that the reader who understands no French may follow the *method*. If he wishes a similar mnemonic he must make one for himself in English. *Translator.*

Suppose, however, that the year does not begin on a Sunday, then the number corresponding to the day on which the 1st of January falls must be added to the number corresponding to the month. In leap years, one day must be added to all the numbers after February.

CHAPTER XXIII.

ESPERANTO.

Most of the educated and intelligent blind people with whom I have had to do have resolved to learn *Esperanto* so that the employment of this admirable international language seems likely to spread more quickly among the blind than among other folk.

Polyglots best appreciate Esperanto, although one would be inclined to think that the need of an international language ought to be felt less by those who already know several languages. This inclination of polyglots to assimilate Dr. Zamenhof's auxiliary language is very important, for only those people who know several languages are able to give an opinion on the merits of a new idiom. The study of Esperanto, according to all who have worked at it, is extremely simple, and, in contradistinction to *Volapuck*, it is melodious. By simple yet ingenious methods Zamenhof reduced to an absolute minimum the effort of memory

necessary for the learning of Esperanto, the outstanding feature of which is that, limiting one's ambition to reading without a dictionary (an all-important matter to the blind), it is possible to reach that goal in a few days of hard study.

Esperanto seems to me likely to prove of much greater use to the blind than to the sighted, for two reasons.

In the first place, the use of contractions in almost every country entails the aggravating consequence that the blind person loses most of the profit he ought to have from his knowledge of foreign tongues. I read fluently, French, German, English, and Italian, and could spell through Spanish, Portuguese, and Dutch. All this, along with remnants of Greek and Latin, is thrown away when I wish to read a foreign publication in contracted Braille. The difficulty of reading foreign languages in contracted Braille is so great that M. Monnier, Secretary of the International Association of Blind Students, is forced to ask his correspondents to write either in uncontracted Braille or in Esperanto. I do not believe it possible to find in the whole of Paris a single individual who can read German contracted Braille.

In the second place Esperanto is likely to become well known among the blind—which is much to be desired—because in any one country the total possible sale of books published in Braille is too small to cover the cost of production.

With Esperanto as an international language such

would no longer be the case. We could be kept in touch with all manner of events by means of a weekly review. We should make the acquaintance of productions of modern literature distinguished by their thoughts rather than by the garb in which the thoughts are clothed, the excellence of which is evidenced by the number of languages into which they have been translated. Zamenhof's translation of Hamlet demonstrates the flexibility of his auxiliary language.

How is the blind man to set about learning Esperanto? The answer to this question might be correct as I write these lines and yet incorrect by the time other people read them. The best book is Zamenhof's Grammar. The French translation of it is the only one with which I am acquainted. I unhesitatingly recommend this grammar and the exercises it contains. If you cannot obtain it in Braille, get it read to you. You will easily find a sighted person who will do this in order to further his own study of Esperanto.

A partnership of two or more people, one of whom is blind, is excellent for the purpose.

In any case, make enquiries as to what works in Braille by Esperanto-writing blind people are published in your own country.

In France, M. Cart, teacher at the Henry IVth School, one of the most zealous upholders of Esperanto, has published in Braille a *résumé* of the grammar and some of the exercises of Zamenhof. It is not advisable to

use M. Cart's text books until the complete grammar has been read from cover to cover.

CHAPTER XXIV.

MARRIAGE.

Should the blind be advised to marry ?

There can, of course, be no question as to the marriage of a blind man to a blind woman ; commonsense forbids that. But may a blind man or woman marry a sighted person ?

In the vast majority of cases there is no probability that the infirmity will be transmitted to the offspring. I was consulted on this point as an oculist, and, not content with my own reminiscences as a practitioner, before replying made search through the numerous biographies of the blind which are recorded in Mell's Dictionary. The results tallied with my own recollection, and I can assert that if there be such a thing as hereditary blindness it is, at any rate, rare enough to have escaped my investigations.

But the medical man must not give his sanction indiscriminately.

The question of heredity does not arise at all in blindness due to accident. The great majority of cases are accidental, for small-pox and ophthalmia of the

new-born, which are and always have been the main causes of blindness, are really accidents presenting no risk of hereditary transmission.

If the blindness, however, is due to an affection of the optic nerve, choroid or retina, the decision must be come to with care. I would object, for instance, to anyone blind from detachment of the retina marrying a very short-sighted person. If, in addition, there were any blood relationship between them my opposition would be insuperable.

With the exception of such unusual cases the medical man need not oppose a blind person's marriage.

Apart, however, from the medical aspect of the matter, other circumstances demand most careful consideration. It is an undoubted fact that when blindness comes on after marriage, and especially when the man is the afflicted one, conjugal affection is increased through compassion. Blindness of one of the pair nearly always results in an increase of mutual regard.

With regard to contracting a marriage the question is very different. It has been presented in various lights in *Les Emmurés*, a fine novel by Lucien Descaves.*

As one would expect from the psychology of the two sexes, among blind people the marriage of girls is much less frequent than that of men. I believe that as a rule such marriages turn out well.

Most often it is the young girl who has learnt the responsibility which she will have to bear, and, reversing

* Stock. Paris, 1895.

the terms of the marriage vows, aids and protects her husband.

At this point I quote with much pleasure a very nice letter received from one of my correspondents:

"Usually the decision depends upon age, health, financial circumstances, and so on. As a rule blind girls ought to give up the idea of marriage. In mournful verse, *L'alouette de Birchow*, Marguerite Wilhelm, the wife of a level-crossing keeper has set down her impressions on the subject. The blind man who marries is likely to be sometimes sick at heart. It is one of his direst privations never to see his wife and children. Often he feels that he is unable to fulfil, as he would like to do, his duties as a husband and a father. He has cares and worries which are avoided by the bachelor. Nevertheless, under favourable circumstances marriage seems quite desirable for him, not only because feminine assistance is almost indispensable, but because more than other men he experiences the need of being among his own trusted people, who will look after him with affectionate care. For him, family life is a source of pure happiness. As for me, I cannot but confess my gratitude for all the pleasure I have in the midst of those dear to me."

There can, at any rate, be no doubt that the blind man will be wise to consider the possibility of lamentable results, and therefore to take close counsel with his best friends before deciding to marry.

Although foreign to my subject, I feel compelled to mention here the danger of consanguineous marriages. They sometimes result in the birth of children who are blind, or even more or less blind and deaf as well. Liebreich in 1868 pointed out the frequence of pigmentary retinitis among deaf mutes whose parents were blood relations. I will reproduce word for word the bitter cry of one of my correspondents:—

"LANSIER PRÈS TRÈVES.
25th August, 1903.

First of all to introduce myself. I am German by birth, an old maid of 33, hard of hearing, and perhaps soon about to take the 'leap into the dark.' My eyes are doomed. With one I cannot see at all, and the visual field of the other is more than two-thirds lost through glaucoma. I am the seventh child of cousins germane. My grandmothers were sisters; whence all my trouble. The State should forbid such marriages, but here in Germany we must wait long for such prohibition. Our royal houses are the worst offenders. How I hope that your beautiful France may give a lead in this matter. The rest will follow.

Having been dull of hearing from childhood, I am accustomed to lip reading. What will be my unhappy lot when no longer able to see?"

CHAPTER XXV.

THE SIXTH SENSE.

It is with considerable hesitation that I write the words "Sixth Sense" at the head of this chapter, for it is very possible that the facts to which I am about to refer are explainable on the assumption that there are but five senses. And, further, in the present state of our knowledge it is doubtful if those for whom this book is intended will derive any immediate practical benefit from the reading of this account. None the less it seems to me useful to record here the information which I have collected about the "Sense of Obstacles," in the hope that someone among my

readers may be induced to communicate to me, for inclusion in a second edition, facts observed or experiments performed, the knowledge of which would tend towards extension of our information on the subject of the perceptions of the blind.

Statement of Facts.—Those who have carefully studied the blind know that totally blind people possess, in greater or less degree, what they themselves term the "sense of obstacles." Children run about the playground without colliding with trees, and that even if they are there for the first time. When walking along a corridor a blind person knows at once if he passes an open door, and it is even stated that some have this sense developed to such a degree that when passing the front of a house they can count the ground floor windows. This perception of obstacles recalls the experiment on bats made by the great Spallanzani. He found that after their eyes had been removed they could still fly without hurting themselves.

The sense of obstacles is quite clearly referred to in some of the biographies of the blind. The earliest description of it with which I am acquainted occurs in Diderot's *Lettres sur les Aveugles.*

Most blind persons state that the principal seat of this sensation is the forehead, never the hands. Some attribute it to air pressure. This cannot be the explanation, because, when questioned on the subject those of whom I have enquired say that the perception is sharper on approaching the object *slowly*. The sensation is

always vague, and some of them describe it as subject to *mirage*. By this they mean that they may be stopped suddenly, when walking, by fear of coming against something, when in reality there is no obstacle.

Before hazarding any explanations of the facts I may say that writers are far from agreeing about them. Some strive to attribute everything to sensations of hearing, others will have nothing to do with the hearing theory. Others, again, admit that the drum of the ear may act as a receiver without producing any actual auditory sensation. Lastly, some blind persons have told me that they believe in a compound of auditory and other sensations without being able to ascribe any particular rôle to each.

The following facts have been collected by me. The reader will note the divergence of opinion as to the effect of snow:

M.G..., teacher of History at the Paris National Institution, lost his sight through optic atrophy when about four years old. He has no sense of smell. He can distinguish light from darkness and occasionally can vaguely make out large objects. No perception of rays from radium. M.G..., an excellent observer, undoubtedly possesses the sense of obstacles, by which he is able, when walking along an avenue, unerringly to avoid collision with trees or iron lamp posts. In the country he can even keep clear of large heaps of stones on the roadside, and recognizes the presence of a wall at more than 2 metres (1 metre=40 inches). In my presence he recognized a large piece of furniture in the middle of a room, and guessed that it was a billiard table. We made out that the mass of the obstacle influences his perception. A sheet of paper does not have the same effect upon him as a heavy book of the same area. He states that in his own house the sense of obstacles is much keener in complete darkness.

There is here no possibility that the perception of large objects is due to a luminous sensation. With him, as with many others, the sense of obstacles almost entirely disappears among noisy surroundings.

The foregoing case came under my own observation. Here is one which a shrewd observer described to me :

" In my neighbourhood I know a very intelligent young man of twenty-seven, blind from his second year, who has just finished his education and his apprenticeship to the calling of piano tuner and salesman. He goes about alone. He lives at a village four kilometres (1 kilometre=1,093 yards) from my house. When he comes to see me he walks very quickly, and unhesitatingly takes a right-angled turn when he comes opposite the road leading to my house. He avoids obstacles by the sense of hearing.

" If the foliage by the roadside be shaken in a strong wind he may perhaps collide with an obstacle which he could avoid in calm weather ; the rustling of the leaves and branches deadens the sound of his footfall.

"When snow is on the ground and he is unable to hear an echo from the trees, he obtains an echo for his guidance by slapping his thigh.

"I performed the following experiments with this young man :

(1) "Placing him near a wall I made him turn round and round several times, and then asked ; where is the wall ? He replied :- ' Your voice echoes from the wall which is *there*,' pointing to it quite correctly.

(2) "Placing myself between him and the wall, a carpet under his feet, I instructed him to turn round and round and to point to the wall as soon as he stopped. I stopped him with his back to the wall. After a moment's hesitation he said ' The wall is . . . behind me ! '

" Asked how he came to this conclusion he replied, ' At the first words, *the wall*, I failed to hear an echo of my voice from any obstacle in front, and therefore concluded that it was behind me.' "

Another blind man whom I know finds his way with difficulty when there is snow on the ground, and declares

that he has the same difficulty when going about the house in felt slippers.

The following is an extract from a letter by M. Imbert, Professor in the Medical Faculty at Montpellier :

" I began experiments with M. Ferrari, a teacher at the Montpellier Institution, who has no perception of light at all. He told me of a fact about himself which I think will interest you. When there is a thunderstorm he is distinctly conscious of a short flash before he hears the thunder, and yet he has no perception of light. M. Ferrari cannot, however, define the sensation which he has, but it exists, and he is never mistaken. This seems at first very difficult to explain, but the explanation is to be looked for, I think, in the known realm of physics, and must have something to do with variations of the intensity of the electric field about one during a thunderstorm. None the less this explanation will perhaps be very difficult to prove by experiment."

This passage from M. Imbert's communication is particularly interesting because he himself is more inclined to explain by the auditory theory most of the phenomena which we are discussing. He has made experiments analogous to those of William James, which will be described further on.

I have kept for the last a much more complete instance than those just described. The case is that of W. Hanks Lévy, who, on page 64 of his work, " Blindness and the Blind " before mentioned, tells us in the following words about his perceptive faculty :

" Whether within a house or in the open air, whether walking or standing still, I can tell, although quite blind, when I am opposite an object, and can perceive whether it be tall or short, slender or bulky. I can also detect whether it be a solitary object or a continuous fence ; whether it be a close fence or composed of open rails, and often whether it be a wooden fence.

a brick or stone wall, or a quick-set hedge. I cannot usually perceive objects if much lower than my shoulder, but sometimes very low objects can be detected. This may depend upon the nature of the objects, or on some abnormal state of the atmosphere. The currents of air can have nothing to do with this power, as the state of the wind does not directly affect it; the sense of hearing has nothing to do with it, as when snow lies thickly on the ground objects are more distinct, although the footfall cannot be heard. I seem to perceive objects through the skin of my face, and to have the impressions immediately transmitted to the brain. The only part of my body possessing this power is my face; this I have ascertained by suitable experiments. Stopping my ears does not interfere with it, but covering my face with a thick veil destroys it altogether. None of the five senses have anything to do with the existence of this power, and the circumstances above-named induce me to call this unrecognized sense by the name of 'Facial Perception.'

"Dr. Saunderson could tell when a cloud obscured the horizon. At one time I could do this with great accuracy, but cannot now trust myself in this respect. Whether long residence in London where clouds may be said to be the rule, may account for this I cannot say. I have known several persons totally blind possessing this power; Mr. Farrow among others.

"The presence of fog interferes greatly with 'facial perception,' the impressions of objects are faint and untrustworthy. I believe that experiments will show that the drier the atmosphere the more perfect the exercise of this sense, and what relation electricity may bear to it is yet to be ascertained. I have a strong conviction that eventually it will be demonstrated beyond doubt that various substances, such as iron, stone, etc., convey different impressions to the face, but a more minute examination of the subject is required. Although, as above stated, fog is an impediment, ordinary darkness is no inconvenience; anything, however, which attracts the other senses, such as noise, partially occupies the attention of the mind, and so interferes with the impressions received through 'facial perception.' What influence the cause of blindness may have on this subject I cannot say, but probably very little, for in my case the sight of one eye was lost soon after birth, and the

other by an accident, and Saunderson became blind in infancy. With those, however, who lose their sight from nervous disease the case may be different, as doubtless with them the whole system suffers from the same disease that produced blindness.

"When passing along a street I can distinguish shops from private houses, and even point out the doors and windows, etc., and this whether the doors be shut or open. When a window consists of one entire sheet of glass it is more difficult to discover than one composed of a number of small panes. From this it would appear that glass is a bad conductor of sensation, or at any rate of the sensation specially connected with this sense. When objects below the face are perceived, the sensation seems to come in an oblique line from the object to the upper part of the face. While walking with a friend in Forest Lane, Stratford, I said, pointing to a fence which separated the road from a field, 'those rails are not quite as high as my shoulder.' He looked at them, and said they were higher. We, however, measured and found them about three inches lower than my shoulder. At the time of making this observation I was about four feet from the rails. Certainly in this instance facial perception was more accurate than sight. When the lower part of a fence is brickwork, and the upper part rails, the fact can be detected, and the line where the two meet easily perceived. Irregularities in height, and projections and indentations in walls can also be discovered."

Explanation.—The preceding facts are not by any means numerous enough to permit of our grasping the mechanism by which the blind recognise the presence of obstacles. It is, however, impossible not to think of the lecture by Lord Kelvin * on "The Six Gateways of Knowledge." What follows is not opposed to Lord Kelvin's ideas.

Man has six senses, not five. It is not at all legitimate

*William Thomson (Lord Kelvin), Address at the Birmingham and Midland Institute, October 3, 1883. Published in Vol. 1 of Lord Kelvin's *Popular Lectures and Addresses.*

to include the thermal sense in the group known as the sense of touch. That the seat of these sensations is different, is proved by the disease of the spinal cord known as *syringomyelia*. This disease is characterised by the loss of thermal sensation, while the sense of touch is preserved. Since sound is not transmitted through a vacuum, there must be contact of actual matter before we can hear. It is probably the same with odours, and, as its name indicates, the sense of touch properly so called is only exercised by contact. With the sense of sight it is quite different. In this case we are conscious of vibrations belonging to a certain portion of the spectrum. Now the skin is affected by portions of the spectrum which cannot be recognised by the eye. The form of sunstroke produced by reflection from snow, or by the electric arc light (in which cases there is seldom any sensation of heat) is generally attributed to the action of ultra-violet rays. On the other hand, and this is the interesting point for us, the rays below the red of the spectrum give rise to a sensation of heat.

The idea of radiant heat is an every-day one. We may have a sensation of heat even when the skin is not in contact with a hot object. On a fine winter day we feel the heat of the sun. Sitting before a fire, in the coldest room, a good blaze will scorch the face so that a screen is required to protect it.

If perception through the forehead is a phenomenon due to radiation, those who possess the power should be

able to increase it by blackening the forehead with lamp-black. We all know that dark clothes make us feel the solar radiations more than light-coloured garments.

It would be interesting to investigate the question whether or not invisible radiations play any rôle in the perception of obstacles by the blind.

A fact cited by William James* does not appear to favour such an hypothesis :

"One blind gentleman, Mr. Kilburne, an instructor in the Perkins Institution in South Boston, who has the power spoken of in an unusual degree, proved, however, to have no more delicate a sense of temperature in his face than ordinary persons."

Further, after experiments had been made by carefully stopping up his ears it was concluded that Mr. Kilburne's sense of obstacles depended upon hearing.

To the foregoing theoretical notions, which differ but little from Lord Kelvin's, I would add that, embryologically, the retina is derived from the cutaneous epithelium. It is, therefore, quite conceivable that the epithelium in the forehead region may be slightly affected by a certain portion of the spectrum, not necessarily the same as, and perhaps even far removed from, the luminous portion. For this reason I have tried to discover whether the forehead of a blind person is affected by rays emitted from radium. The result of this experiment, which has been too much discussed by the press, was quite negative.†

* Principles of Psychology, Macmillan & Co., London, 1891. Vol. II, p. 204.

† See *Bulletin de l'Académie de Médecine de Paris*, meeting of April 1st, 1902.

Practical Applications.—It would possibly be useful, and certainly be interesting, to investigate the birth and development in the adult of this sense, which, up till now, has seemed to me to belong only to those who have become blind early in life.

As a foundation for this study it seems logical to enquire of those who possess it what are the most favourable conditions for the exercise of the sense of obstacles, and then to place the adult under the same conditions. Unfortunately the few results which I have hitherto been able to collect are both inaccurate and contradictory.

Shortly after the onset of my affliction I first heard the sense of obstacles spoken about, and I tried to find out if that sense would be of any use to me. The results were negative, and, making a rash generalisation, I had concluded that the privilege belongs only to those blind from birth, when I received from M. Léon, who possesses the sense in a marked degree, information about James's book (already quoted) with a reference to the following passage :*

"The tympanic membrane is furthermore able to render sensible differences in the pressure of the external atmosphere, too slight to be felt either as noise, or in this more violent way. If the reader will sit with closed eyes and let a friend approximate some solid object, like a large book, he will immediately become aware of the object's presence and position—likewise of its departure. A friend of the writer, making the experiment for the first time, discriminated unhesitatingly between the three degrees of solidity of a board, a lattice frame, and a sieve,

* Loc. cit., p. 140.

held close to his ear. Now as this sensation is never used by ordinary persons as a means of perception, we may fairly assume that its felt quality, in those whose attention is called to it for the first time, belongs to it *quâ* sensation, and owes nothing to educational suggestions. But this felt quality is most distinctly and unmistakably one of vague spatial vastness in three dimensions—quite as much so as is the felt quality of the retinal sensation when we lie on our back and fill the entire field of vision with the empty blue sky. When an object is brought near the ear we immediately feel shut in, contracted ; when the object is removed we suddenly feel as if a transparency, clearness, openness, had been made outside of us. And the feeling will, by any one who will take the pains to observe it, be acknowledged to involve the third dimension in a vague unmeasured state."

William James adds in a note "that the sensation in question is one of tactile rather than of acoustic sensibility would seem proved by the fact that a medical friend of the writer, both of whose *membranæ tympani* are quite normal, but one of whose ears is almost totally deaf, feels the presence and withdrawal of objects as well at one ear as at the other."

From these few lines I conclude that others more gifted than I will succeed where I have failed. I present them with a subject for study. It is to be presumed that by varying the objects employed it will be possible to determine what conditions are most favourable to the inception of the sense which we have been discussing in this chapter, and that, the first and most difficult step once taken, such experiments will lead on to practical results.

CHAPTER XXVI.

PSYCHOLOGY OF THE BLIND.

Egotism and vanity are the principal motives of man's actions. Among the blind these defects are sometimes very marked. It is quite natural that the blind man, deprived of his chief means of looking after himself, should be greatly pre-occupied with number one, and should expect, and even exact, assistance from other people; natural, in fact, that he should be selfish at the expense of those better armed for the struggle of life. His vanity—and vain he often is— is mainly fed by that admiration of his ability to manage without assistance which is expressed by the sighted.

After all, is vanity really a vice? Is it not often rather a motive for good?

What harm is there in the blind man making himself useful, and so feeling that he works for others? Why should he not assist his family in spite of his infirmity, and be proud of it too?

"Moralists have said, Stifle your pride. Justify it, say I; that is the secret of all great lives."*

The blind are prone to become very reflective, to

* Daniel Stern. *Esquisses morales et politiques.*

ruminate on and draw logical conclusions from the past. And so it frequently happens that a blind man is a wise man, especially if blind late in life. It is not unusual to find him intimate with young people, an intimacy which he enjoys and they profit by.

The born blind are often imbued with strong religious beliefs, a fact which need not excite surprise. Accustomed as they are to the mental realisation of objects they do not see, they readily believe in the immediate presence of an invisible God, and incline towards a kind of mysticism which is apt to detach them from the mundane affairs of their fellow men.

When a young man has just lost his sight he must not be left longer than is absolutely necessary in a blind institution. Such special environment, in fact, is particularly ill-suited to the development of those personal qualities which are necessary in everyday life.

I have been interested in a research upon the inner life of the blind, and have found more information in the works of realistic novelists than in special works on the subject.*

I have read with interest Korolenko's *Musicien Aveugle* † and have already sung the praises of Lucien Descave's *Les Emmurés*.

---

* A long list will be found in the *Encyklopädisches Handbuch des Blindenwesens*, by Professor Alexandre Mell, 2 vols., 8vo., Pichler, Vienna and Leipsig, 1900.

† Volume of Novels entitled *La forêt murmure*, French translation, Armand Colin, Paris, 1895.

Marc Monnier's novel *Entre Aveugles* * presents to us the impressions of a man who had been blind from birth, and who has just obtained sight by means of an operation. The author is inspired by the celebrated account by Jurin in *Smith's Optics* of the impressions of a blind man who had got his sight through operation, by the oculist Cheselden, nearly two hundred years ago.

This observation is reproduced more or less completely in treatises on physics, physiology, and psychology, and especially in Helmholtz's Physiological Optics. †

Under the title *Roman d'une Aveugle* ‡ M. Dufau, who for long was Director of the Paris Institution, wrote a novel in which observations drawn from real life are recorded.

Most blind writers, poets particularly, make the mistake of attempting to describe visual sensations which they only know about by hearsay. M. Guilbeau, in his *Chants et légendes de l'aveugle*, § the preface to which is of great psychological interest, avoids this pitfall; so also does Madame Galeron de Calonne, who is blind and almost totally deaf. I cannot resist the

* *Le Charmeur*, Charpentier, Paris, 1882.

† Translation by Javal and Klein, Masson, Paris, 1878.

‡ *Le Roman d'une aveugle-née.* Paris, 1851. (National Institution.)

§ Paris, Boulanger, 1894.

temptation to quote a few of this remarkable woman's verses :*

[The Translator, after many attempts, gave up all hope of rendering these lines into English verse. They are therefore given here in the original only.]

"RÊVE D'AVEUGLE.

"Quand le sommeil béni me ramène le rêve,
Ce que mes yeux jadis ont vu, je le revois ;
Lorsque la nuit se fait, c'est mon jour qui se lève,
Et c'est mon tour de vivre alors comme autrefois.
. . . . . .

"Êtres mal définis, choses que je devine,
Tout cesse d'être vague et vient se dévoiler,
C'est la lumière, c'est la nature divine,
Ce sont des traits chéris que je peux contempler.

"Et quand je me réveille encor toute ravie,
Et que je me retrouve en mon obscurité,
Je doute et je confonds le rêve avec la vie :
Mon cauchemar commence à la réalité.

QU'IMPORTE !

"Je ne la vois plus, la splendeur des roses,
Mais le ciel a fait la part de chacun.
Qu'importe l'éclat ? J'ai l'âme des choses ;
Je ne la vois plus la splendeur des roses ;
Mais j'ai leur parfum.

"Je ne le vois pas ton regard qui m'aime
Lorsque je le sens sur moi se poser.
Qu'importe ! un regret serait un blasphème.
Je ne le vois pas ton regard qui m'aime,
Mais j'ai ton baiser."

* *Dans ma nuit.* Alphonse Lemerre. Paris, 1897.

There is nothing commonplace about this. Should not the example of such mental serenity shame those who are plunged in dull despair by their affliction? Each is ready to think that blindness is a worse fate for him than it would be for his neighbour. Instead of contrasting our lot with that of the sighted, ought we not rather to think of those, who, deaf as well as blind, are outcasts in black darkness, solitude, and misery?

A few lines near the beginning of *Stello* refute the assumption that the blind are happier than the deaf. "If the deaf person appears always dull, it is because we only see him at the time when he would like to hear our voices; and if the blind man seems always happy and smiling it is because we see him when he is consoled by our speech."

I fully endorse the opinion of Alfred de Vigny. The difference to which he refers is still more marked if observation is confined to those who have lost one of their senses after having enjoyed the use of it. Deafness, unlike blindness, does not shatter a man's career. He is still free, while the blind man is at the mercy of others. The deaf can allow themselves the luxury of being peevish, but the blind must always smile. It may be said, in fact, that though the blind man is more affable than the deaf, though he strives to appear cheerful and sociable, it is all an indication of his fear of being left alone in darkness.

I must admit that Madame Galeron de Calonne, whose double affliction dates from the age of ten,

expressed to me the opposite opinion. This I believe is accounted for by the fact that she is not absolutely deaf, and is daily made aware of the imperfection of her hearing.*

Among well-to-do people, those whose aim in life has been only to enjoy themselves and to look after number one, are, when they become blind, most unhappy of all. By a kind of distributive justice, those, on the other hand, who have considered the principal aim of life to be to contribute to the world's progress to the best of their ability, are possessed of inward resources. Whatever his social position and his intellectual powers, each one of us can always find satisfaction in contributing to the common weal.

Scientific men are very well placed because a stock of acquired knowledge is at their disposal. So long as they can add a stone, however small, to the edifice of progress and civilization, they feel that they really live, and that though wounded they are not *hors de combat*. The inferiority of their weapons does but increase their ardour. Still more happy are they, if, in addition

* Madame Galeron, during several months of complete deafness, communicated with her husband by means of the Morse alphabet. This was sometimes done without the knowledge of other people present, even when husband and wife were some distance apart, by the shaking of a table. Since she can only communicate with others by contact, she has acquired an extraordinary memory of the characters of different hands, and can recognise people by this means, even after an interval of several years. One of her daughters had the idea of actually speaking into her mother's hand, and she thinks she catches some words, probably by feeling the movements of the lips and of the breathing.

their work has been of use to somebody and they can repeat calmly this saying from the book of Ecclesiastes, "For my heart rejoiced in all my labour; and this was my portion of all my labour."

APPENDIX.

After the present volume had been printed I again took up the study of the question of the reading and writing of the blind, in a volume shortly to be published by Felix Alcan, Paris. Those interested in the subject will find in that book an entire chapter dealing with these important questions, and illustrated with figures not yet published.

CHAPTER XXVII.

METHODS OF ACCELERATING READING.

This book is certain to be perused by a few typhlophiles interested in the improvement of books for the blind. For them this chapter is written. It is almost too much to hope that it may be read by someone who combines the characteristics of mathematician, physiologist, philologist, and printer. He would possibly find in it some hints on the improvement of books in embossed points.

It will be objected, of course, that if Braille writing is open to criticism, so also are ordinary writing, ordinary print, and ordinary music writing. This is quite true, but the various notations employed by the sighted are protected by time honoured custom, a custom so deep-rooted that it may not be rashly attacked. For instance, the writing of music on a five-lined stave is the height of absurdity,* yet this routine method has successfully resisted the efforts of J. J. Rousseau, Galin, Pâris, Chevé and their successors.

With point writing the case is quite different. The number of books printed in Braille is exceedingly small, and were a

* If the stave must be retained, it would be reasonable to adopt, for the piano, the double three-line stave of the well known General Reffye, in which, since each stave can carry seven notes, two octaves for each hand are written without additional lines. The advantages of this are, that keys are done away with, and that the beginner can read music very much more easily

more rational method of writing adopted the sacrifice of existing books would be easily counterbalanced by the gain in other respects.

The following indications of the path which the reformer should follow are of use principally for languages having a bizarre orthography, such as English and French.

To make reading more rapid is the principal object of my remarks. It will be seen presently that a bye-result of the employment of methods which accelerate reading would be a diminution in the size of books, the learning of stenography by the blind, and shortening of apprenticeship to reading and writing.

It is plainly necessary, if reading is to be accelerated, that we should have more easily recognizable letters, and also a diminution in the number of letters in words. The former of these two improvements is within the special province of the printer and only calls for a few remarks, the latter is a most complicated problem, the study of which requires previous knowledge of the various systems of stenography.

PART I.

TYPOGRAPHICAL REFORM.

The recently blind are best able, perhaps, to appreciate the difficulties involved in deciphering characters formed of points. Those who have been Braille readers from childhood no longer find any difficulty when a word contains a crowd of letters formed of five or six points each, and do not notice the confusion which results, in reading contracted Braille, from the accumulation of signs formed of a very small number of points. They have forgotten the trouble they used to have with the capital letter symbol (which is so like the commencement of the letter *m*), with the italic sign, or with the sign analogous to the latter which occurs in the middle of some contracted expressions.

When moveable type is used, as in the printing done at the Paris Institution, it is easy to have the capitals printed in more

prominent points, and to make use of the same plan for all the words which, in ordinary type, appear in italics. If it happens that the reader fails to notice the change of type, it does not matter very much after all. Some other reading difficulties would be avoided by replacing certain groups of points by groups of little lines forming the same figure. For instance, *b* would be a small vertical line, *c* a horizontal line, *d* an angular figure, *e* an oblique line, etc. At first touch such characters hardly differ from groups of points, but when there is any difficulty they are more easily read. For example, with this kind of letter it is not possible to confuse the groups *ea* and *ari* of contracted Braille. Again, the spaces between the letters being a little greater than the size of the letters, a series of *c's* appears thus : •• •• •• •• The difference in the distance between these various points is not very noticeable to the fingers and the reader would hesitate less if the two points of each *c* were replaced by a small continuous line. Thus the word *acacia* would be printed • — • — • • and would still be written • •• • •• • • In the same way the confusion between *l* and *t* would be less, if in the latter the points 2 and 5 were replaced by a little horizontal line, and so on.

In following such a plan printers of books would be guilty of no disrespect to the memories of Barbier and Braille, because, though these pioneers employed points only, it was not on account of legibility, but with the purpose of avoiding complication in writing by hand.

It is quite natural that our printing and manuscript should have remained identical for years. The same thing happened when ordinary printing was introduced. Gutenberg slavishly copied the characters used in his time, so much so that the first books he printed were sold as manuscripts.

Since a more complicated letter does not increase the work of the printer, the time is not far distant when useful modifications will be made upon the embossed letters of our books.

After reading the above, M. Guilbeau drew my attention to a sample of print, on the lines I have just indicated, which was brought out some time ago by M. Kunz, the well-known director of the Illzach Institution, near Mulhouse. In the alphabet

which M. Kunz has been kind enough to send me I think that the substitution of lines for groups of points has been carried rather far. In every country, of course, embossed characters are made as small as is compatible with easy legibility. Diminution in size is especially suitable for printed books, in which the characters are more regular than in the best manuscripts. The size which is most convenient for one individual may, evidently, be unsuitable for others. It would take too long to state experimental results, but I may say that there is a particular size of type which suits each individual reader. If a character be too large, its dimension exceeds that of the most sensitive surface of the finger; if too small, it is difficult to decipher. Since *contracted Braille* gives rise to greater confusion than *uncontracted*, it would be quite logical to write the latter smaller than the former.

Numerical Example. It appears to me that tactile legibility is almost the same for *uncontracted Braille* of 6 millimètres, as for *contracted Braille* of 7 millimètres high. To show the economy of surface in substituting 6 for 7 millimètre letters, the difference of their squares is $49-36=13$. The economy of surface is more than a quarter. If, then, my estimate be correct, the possibility of smaller writing in *uncontracted Braille* means an economy of surface equal to that produced by using *contracted Braille*, so that the only advantage left in favour of the latter would be to increase the writing speed of those who use it daily.

There is, therefore, nothing to be gained in advising charitable people who devote their leisure to enriching our library, to employ *contracted Braille*, since it is more difficult, and leads to mistakes more often than does the uncontracted form.

What I have just said possibly does not apply to other than the French contracted writing. I have such a superficial acquaintance with foreign contractions that I cannot give an opinion upon them, but as far as French is concerned the diminution of space which results from the reduction in size of the letters has the advantage that it is distributed over all, including proper names and the spaces between the words, whilst contraction chiefly curtails the short words. Further, the diminution which I am upholding economizes a little on the

blank spaces at the ends of lines, and lessens the number of words divided.

Lastly, a smaller letter, composed of less prominent points, produces a considerable effect on the thickness of the book.

PART II.

DIMINUTION OF THE NUMBER OF SIGNS.

In order to increase the speed in reading it is especially necessary to reduce the number of signs. As has been stated on page 68 the sighted person's eye moves in jerks, and at each movement reads about two letters. On the other hand the finger of the blind reader possesses nothing analogous to indirect vision which, by extending the visual field, assists so much in rapid reading. However practised the blind reader may be, the rapidity of movement of his forefinger is limited, and if the limit be exceeded the tactile sense becomes confused.

In the same way the eye fails to distinguish objects, such as the spokes of a carriage wheel, which are moving beyond a certain rate of speed.

Diminution in the number of characters can be attained, firstly, by the suppression of those which represent mute letters, or letters which are easily guessed ; secondly, by the use of signs which represent groups of sounds. Thus we are led to employ methods which are analogous to those of stenography.

Let us see first of all what is the present status of writing in embossed points, and shortly run over the history of the system.

BARBIER AND BRAILLE. Like Minerva, who sprang fully armed from the head of Jupiter, our embossed point writing, with its technique, sprang from the brain of Charles Barbier. The details can be obtained from this author's two works already cited. These two brochures are worth reading and thinking over. When it is realized that Barbier alone discovered the principle, now universally admitted, that, as regards sensibility to touch.

points are superior to lines; that he grasped the necessity of grouping the points regularly, and invented the appliances used even at the present time, the style, the grooving, and the perforated frame, it naturally occurs to us to ask if we should not pay attention also to Barbier's views on phonography.

Barbier's brochure of 1834 commences with the following words:—

"Writing words as they are pronounced is what we all do before we have studied orthography and grammar. Many people never do otherwise."

Barbier demonstrated as early as 1820, without possibility of dispute, that for illiterates, including the blind and the deaf mute, it is very much easier to learn to write according to some well understood phonetic system than orthographically.

On the passing, in 1833, of the celebrated Guizot law which organized primary education in France, Barbier returned to the charge in the presence of an immense number of adult illiterates. He said that he considered it would be wise to restrict the first effort of teachers so that only phonography should be taught to most children, and to reserve for the few the difficulties of grammar and orthography.

Times have changed, but human intellect remains the same. In France and England it is as true to-day as it was in 1833 that the most rapid method of teaching ordinary reading is to teach phonography first. This was conclusively proved by the great pedagogue Paul Robin, when he was head of the Prévost Orphanage at Cempuis (Department of the Seine).

The test was no less conclusive in England. Children who, after several years at school, could only read monosyllabic words, were quickly enough taught to read by first teaching them to read phonographically.

Barbier's phonographic method was accused of spoiling orthography. To this Barbier made the clever and sensible reply that speech is essentially a phonography, and that, to be logical, his opponents ought to prevent children from speaking until they had learned orthography.

Blind men of note, to whom I may happen to uphold such views, make the triumphant rejoinder that some young people

have obtained University degrees. I therefore made enquiry about each one of the students, and, to my surprise discovered that orthography is less useful than might be imagined. One of them, for instance, who obtained his bachelor's degree with honours, told me that he was allowed to dictate the answers to his examination papers. It is surely intolerable that the education of the great mass of blind children should be retarded in the interest, the quite doubtful interest, of half-a-dozen youths.

When Barbier gave us point writing he thereby abandoned the use of characters legible by the sighted. Between them and us he saw a great gulf; communication between blind and sighted was interrupted, and owing to this inconvenience, in spite of its great superiority *quâ* the sense of touch, point writing was for many years prevented from becoming general, especially in England.

From the time when we are isolated by writing of our own we need no longer suffer the inconvenience of ordinary writing. Barbier did not hesitate, but threw orthography overboard, thereby at once rendering our writing much easier to learn, less clumsy and more rapid.

I am well aware of the determined resistance with which Barbier's ideas about orthography were overwhelmed. Blind people are possessed by a positive craving to seem as little different from the sighted as they can, and all of those to whom I have spoken take it as a personal injury that one should dream of not teaching orthography to the youthful blind. I have listened to their arguments with attention, and I am not convinced. They pretend, what is contrary to fact, that people who cannot spell in the proper way are liable to make dreadful mistakes in speaking. They say, which is still more incorrect, that such a state of ignorance puts them in a position of inferiority when in the society of educated people.

Ignorance of orthography in a person blind from birth can only be apparent to the sighted when ordinary writing is attempted. I persist in thinking, therefore, that there is no sufficient reason for teaching orthography in the primary classes of Blind Institutions to children who have so much else to learn;

so much to learn which the sighted learn without thinking. So many, indeed, are the things blind children are not taught, that they are quite at a loss when they leave the Institution where their education has been obstructed by orthography and music. And yet each one of them has cost the country more than would educate a master of Arts or of Science.

It is my opinion that the study of orthography should be reserved for the few among our youthful blind, who, in spite of their infirmity, are sufficiently gifted to proceed to secondary or even higher studies, and for those who intend to become typists. And, as it happens, these few would find in the use of phonography during childhood a perfect preparation for the stenographic art, which in turn would prove of service in their higher studies.

I consider that we ought to take up point writing from the time of the adoption of the six point cell, travelling along the straight path cut out by Barbier, from which strayed Braille with his orthography and Ballu with his stenography.

The abandonment of phonography is to be imputed rather, perhaps, to his surroundings than to Braille himself, but Braille undoubtedly merits praise for establishing the ten-sign standard line both for letters and figures, in such a way that each of these, including the first three, remains readable by itself, since the three fluctuating signs chosen by him cannot be confounded one with another.

It is a very fortunate combination, especially for numbers. Braille seems to have been so pleased with his idea that he made his alphabetical table consist of only ten columns, thereby leaving thirteen signs outside the table ; an inconvenience and a waste which would not have been sanctioned by Barbier.

Braille fell into another error. Out of respect for traditional alphabetical order he did not preserve the logical derivations which Barbier had carefully arranged. Thus in Barbier's table *de* is placed under *te* and *an* under *a*. These logical derivations present the trifling advantage of facilitating the study of the system, and the very great one of improving legibility (see p. 79). As M. Dechaux very justly remarks, it is a great advantage to have analogous sounds represented by

signs which differ but little from one another. This is what M. de la Sizeranne so successfully did for contracted Braille, in which *an* and *ar* are reminiscent of *a*, *in* of *i*, and so on. In the Braille alphabet itself, there is not, on the contrary, any true relationship between the sounds of the standard line and those which are derived from it. Braille's printed table has been encumbered by his method of shortening the standard line to ten signs instead of fifteen and a blank, and introducing a crowd of accented letters, which, while not particularly useful for French, are detrimental to the application of the system in other countries. Thus it happens that the formation of derivations, which, as will appear later on, are extremely useful, is prevented by this reduction of the number of signs to fifty, and by the accumulation of accented letters.

Braille Sonography.—This hybrid name, half Latin, half Greek, denotes a phonographic and alphabetic hybrid system which was for a while in use at the Paris Institution. At the present time it exists only in the memories of a few blind people. As an example of it I shall give here the table of the signs of the system so far as I have been able to collect them. The phonographic signs are printed in italics; the reader may work them out in Braille for himself. Each is followed by the sign = and then by the sound or sounds which it represents.

a=a, â. — *b*=be. — *c*=ce. — *d*=de. — e=é, ai, et. — *f*=fe — *g*=gue. — *h*=tr. — *i*=i. — *j*=je. — *k*=pr. — *l*=le. — *m*=me. — *n*=ne. — *o*=o, au, ô. — *p*=pe. — *q*=que. — *r*=re. — *s*=se. — *t*=te. — *u*=u. — *v*=ve. — *x*=x. — *y*=our. — *z*=ze. — *ç*=ieu. — *é*=é. — *à*=or. — *è*=ais, es, ès. — *ù*=oin. — *â*=an, en. — *ê*=in, ain. — *î*=on. — *ô*=un. — *û*=eu. — *ë*=ou. — *ï*=oi. — *ü*=ch. — *œ*=gn — *w*=ll. — *Numérique*=ui. — *Majuscule*=cr. — *fin de vers*=ien. — *un*=ion. — *ai*=ian.

This sonography is empirical, and is unsuitable for transformation into stenography. It has been given up.

It would be more methodical to return to the thirty-six speech sounds of Barbier, retaining his printed table (page 79), but replacing the two vertical rows by combinations obtainable from our two three-point columns. Thus, in the left-hand column, the numbers 1 to 6 would be represented by the six combinations, 1, 3, 1-2, 2-3, 1-3, and 1-2-3.*. These six combinations would denote the six lines of Barbier's printed table, and similar combinations of the figures 4, 5, 6 would indicate the vertical column. There might in this way be obtained thirty-six signs, of very fair legibility, as may be proved by making the attempt; and, since points 2 and 5 are only used in association with another point of the same column, the signs are easy to prick out correctly.

For more details on this use of the rectangular cell see page 150.

CONTRACTED BRAILLE (*Abrégé orthographique*). The slowness of uncontracted Braille (*écriture orthographique de Braille*) brought forth many abridgments in addition to the sonography previously mentioned. All of these were illogically conceived and injurious to orthography. To be logical, the blind had to create an abridgment of orthographic Braille and this was done mainly through the efforts of M. Maurice de Sizeranne and Dr. Armitage, so recently as 1882. These abridgments fulfil the modest requirements which had been proposed, namely, to save time and paper without damaging orthography: this latter is an important point. Here then we have a fairly rapid method of writing, but one which is burdened with a number of mute letters.

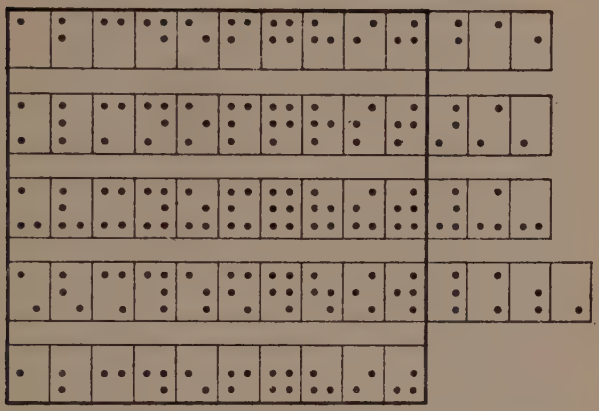
In order to understand the genesis of contracted Braille Braille's Alphabet table is next reproduced, and outside of it, on the right hand side, are the thirteen signs which can be formed n the rectangular cell over and above the fifty in the table.

* English Braille readers should note that in France the points in the rectangular cell are numbered thus:—

Translator.

1	4
2	5
3	6

TABLE OF THE SIXTY-THREE POINT-SIGNS.



Here is the same table printed, in which the signs not employed by Braille are designated by Greek letters.

PRINTED TABLE OF THE SIXTY-THREE SIGNS.

a	b	c	d	e	f	g	h	i	j	α	β	γ	
k	l	m	n	o	p	q	r	s	t	œ	ì	'	
u	v	x	y	z	ç	é	à	è	ù	numérique.	ò	—	
â	ê	î	ô	û	ë	ï	ü	œ	w	δ	majuscule.	ϵ	ξ
,	;	:	.	?	!	()	"	■	"				

Most of the thirteen signs not used by Braille are thin signs and short signs.

Thin signs (*signes minces*) are those wholly formed of points on one and the same vertical line; thus *b*, *l* and especially *a* are thin signs, while *e* and *i* are not termed thin: *c* is a short sign.

The thin and the short signs may be regarded as moveable in the cell, for the symbol which they form has a different meaning according to its position on the right, left, upper, or

lower side. These moveable signs are obviously indistinguishable from each other when standing alone, and there may be some hesitation in recognizing them even when in the middle of a word.

In contracted Braille the sixty-three signs of the preceding table are employed.

A consideration of the following tables will help us to understand it. In the first are shown what in England are called *contractions, i.e.*, groups of letters which correspond to the respective signs in the two preceding tables (page 133).

TABLE OF CONTRACTIONS.

1st line.	. . . . .	bl ar eu
2nd line.	au	em ai .
3rd line.	. . . . . ch . oi	ion on .
4th line.	. . . . . pl gr ou . om	ll eur or ieu
5th line.	an br cr ien en pr gn er in tr	

By means of this table let us write out some phrase containing a number of contractions. Instead of writing in points by means of the first table on page 133 we shall print it according to the second table on that page.

Such a sentence as this :—

On arbora même sur le plus grand mât
le drapeau tricolore bleu blanc et rouge,

will be written thus :

ò βbora mæe sur le ëus ï, d mát
le drapek "icolee ay a,c et rüge

But this system still leaves a very large number of whole words. Forty-three of the most frequently occurring words may, therefore, be represented by a single sign.

These abbreviations are shown in the following table.

Table of Abridged Words.

1st line.	.	bien	ce	de	.	faire	qui	sur	il	je	,	.	
2nd line.	au	le	me	ne	nous	par	que	rien	se	te	les	ai	la
3rd line.	un	vous	mais	.	elle	pour	quoi	.	sans	et	lui	on	celui
4th line.	tout	même	cet	dans	est	plus	grand	ou	son	tous	.	.	.
5th line.	.	.	.	.	en	.	.	.	.	.			

Making use of this table the preceding phrase now becomes :

ò βbora ê h l ë ï mât

l drapek "colee ay a'c ù rüge

Furthermore, one hundred and forty-seven other frequently occurring words are represented by groups of two signs each and lastly, one hundred and one expressions such as *au-contraire*, *c'est-à-dire*, are represented by special arrangements of signs.

All this great expenditure of ingenuity has succeeded, as has been mentioned before, in shortening writing by one quarter, without in the least increasing the rapidity of reading.

This system is severely criticised by M. Ballu* who remarks : "It is a calamity grafted upon our iniquitous and bizarre orthography."

The bitterness of this is explained by the fact that M. Ballu invented a system of stenography.

If contracted Braille is to be comprised in our programme because it diminishes the number of characters, it fails, nevertheless, to attain the end which we had in view. According to the almost unanimous opinion of those concerned, the reading of contracted is slower than that of uncontracted Braille. This is due, probably, to the introduction of thin and short signs for the representation of groups of letters, necessitating very exact recognition of these signs of inferior quality. In retaining the Braille signs for the least useful letters, and for those which

* Compte rendu du Congrès de Bruxelles, p. 152.

when wrongly interpreted cause least confusion, the authors of contracted Braille were compelled to assign important functions to signs which Braille preferred not to include in his alphabet.

Hence results a degree of hesitation in reading which, except with a few gifted professionals, makes it intolerable to listen to contracted Braille read aloud.

If contracted Braille fails to accelerate reading, it is quite otherwise with writing, for this becomes more and more rapid the more the thin and short signs are employed. A sign made up of only one out of six points is as much to the advantage of the writer as to the disadvantage of the reader.

THE STENOGRAPHY OF BROTHER ISIDORE CLÉ.—For those whose desire—not shared by me—was to make writing more rapid, there was a great temptation to methodically abridge contracted Braille. This is what was done by Brother Isidore Clé with a degree of success which has startled even himself.

He taught his stenography to the class which he conducts with such wisdom and zeal at Woluwe-Saint-Lambert (near Brussels).* The children took such pride and pleasure in becoming expert that it became difficult to prevent them from writing their exercises in contracted Braille, a hopeless mistake, since it entailed the sacrifice of orthography. To obtain such a result it was not worth while to take such a long way round. A more or less contracted phonography would have served the purpose.

As matters stand, Brother Isidore Clé, who is a believer in the most extensive reform of orthography for the sighted, proposes to teach his stenography, no longer to school children, but to adults who have an unshakeable knowledge of orthography. Of this I highly approve, because the system ought to be most valuable to a very small number of young people who, already accustomed to contracted Braille, are undertaking more difficult studies.

* Compte rendu du Congrès de Bruxelles, p. 156.

I may remark that it would be very foolish to attempt Isidore Clé's stenography without first knowing uncontracted and contracted Braille. I have no information as to the rapidity with which it can be read.

THE STENOGRAPHIC SYSTEM OF BALLU.—In his very ingenious system Ballu made the mistake of not taking into sufficient account the requirements of foreign languages. He does not seem to have been familiar with the best systems of phonography used by the sighted, and the chief advantage of his own almost disappears with the invention of the Hall machine.

Ballu had the quite natural idea of representing the most common letters by the most simple signs, *i.e.*, those which are formed of the smallest possible number of points.

In spite of the introduction of the Hall machine, the Ballu system still possesses the above-mentioned advantage when the blind man wishes to take notes at a lecture by means of the style.

Since different letters and contractions do not recur with the same frequence in all languages, foreigners have never dreamt of adopting the Ballu system, which is only employed by M. de la Sizeranne and his associates.

Ballu stenography is purely empirical, and so difficult to retain in the memory that blind people who had learned it have quite given it up.

THE ADVANTAGE OF STENOGRAPHY FOR THE BLIND.—At this point it is necessary to enquire as to the precise nature of the services which stenography may render to the blind. It may be assumed that they will find it no easy task to become professional stenographers, because they can hardly appreciate the external circumstances which are an important part of discussions reported by stenographers. Besides, the blind man is unable rapidly to transcribe in typewriting the stenographic notes which he has taken in embossed points, because such transcription necessitates at least three hands. True, professional stenographers usually dictate their notes to a typist, and there is no reason why a blind stenographer should not do the same.

One can easily imagine two blind people forming a partnership in stenography and its transcription.

For the blind the chief use of stenography would be, on the one hand, to increase the speed of correspondence among blind people who are acquainted with the same system, as is the case with M. Sizeranne and some other experts in Ballu stenography ; and, on the other hand, to permit of the taking of class notes by students.

Now, if the student be obliged to copy out these notes afterwards in order to preserve them in a more legible form, the purpose is entirely defeated, for transcription of stenography would be a formidable piece of supplementary labour. For the student, it is sufficient to have an easily legible stenography, the speed of which is at least equal to that of the ordinary writing of the sighted.

In spite of what M. Grosselin has said, I do not think there is any practical gain in making embossed stenography identical with any system of ordinary stenography. Such an identity can be of no use except in the quite rare case of a blind man who might wish to correspond in stenography with a sighted stenographer who had learnt to read Braille. Therefore I shall not be afraid to deviate from the stenography of Aimé-Pâris, which I shall take first as a model.

I have said that the slowness of Braille is regrettable ; it is much less so for writing than for reading. To be convinced of this it is only necessary to examine closely the figures given on page 75. I find it difficult to imagine, in the near future, a student who would not prefer to use at home a machine to take notes of what is read to him, or to write a rough copy. And so, since there is nothing to hinder the use of a machine for writing in contractions, or in stenography, it is clear that the problem of a sufficiently rapid embossed writing is fully solved.

I have pointed out that it is quite otherwise with regard to reading. We have seen that the reading of contracted Braille is much slower than that of uncontracted. That is partly due to the multiplicity of thin signs.

But further, the reading of uncontracted Braille is done by slurring over a great many signs which are guessed by the context,

by the first letters, and the length of the words. So much is this the case that a practised reader may fail to notice a very large number of mistakes in the writing, if they do not occur at the beginning of words. M. Desagher, a very quick reader indeed, tells me that when in an issue of the *Revue Braille* he puts his hands on the erratum of the preceding issue he is surprised not to have noticed at the time any of the faults referred to in the erratum. This trick of guessing, which accelerates the reading of uncontracted Braille, is possible only to a very much smaller degree in reading the contracted form, for the writer of the latter does not consistently use all the abbreviations, and so the words are variable in length.

If the stenography is to be legible it is necessary to be very careful not to reserve the thin signs for the most common speech sounds, but rather the opposite.

Although, as regards stenography, economy of paper and diminution in bulk and weight of our writings may be of secondary importance, it is nevertheless important to note that in these respects nothing is gained by diminution in the number of the points used. There is no economy of paper unless there is a diminution in the number of signs. This would be a matter of importance if stenography came into use for printed books.

On the other hand, an excessive number of points does not seem to me to suit the touch. When, in a proper name, several letters each of more than four points occur one after the other, I have a difficulty in deciphering them. For this reason, I think, it would be wise to adopt a stenography in which the most frequently occurring signs have no more than four points.

I cannot too often repeat that the slowness of Braille is most pronounced in reading. To show how true this is I may relate how on a certain occasion M. Lorin, formerly a telegraph engineer, who has been blind for several years and practises Braille many hours a day, treated a letter which was handed to him in my presence. The letter was in contracted Braille, and therefore, in order not to keep me waiting, M. Lorin gave it to one of his family to read. Again, M. Villey, who, though blind, passed the entrance examination of the higher Normal school, told me how difficult it is to translate a Latin passage aloud. He is unable

to find the verb at the end of the sentence quickly enough to put it in its proper place in the corresponding French sentence.

So as not to make too long a list I shall only add to these two examples of eminent blind people well acquainted with Braille, the names of M. Léon, recently admitted *Agrégé de philosophie* at the Faculty of Bordeaux, and of Messieurs Monnier and Riggenbach already mentioned. They all suffer from the slowness of Braille reading, the value of which to them is further diminished by the fact that the books required in their work do not exist in point writing.

In 1902, at the Brussels Congress, M. Monnier suggested that an international stenography for the blind should be considered. Such a proposal is proof in itself that a stenographic system for educated minds must be easily legible not only by the writer but by all well informed blind people.

I trust that this much-desired improvement will be taken into consideration by the one man in France who knows all about the details of embossed stenography, namely, M. Dechaux of Montluçon. Whilst he had sight M. Dechaux was acquainted with the Duployé system, and when he became blind closely studied the stenography and rapid writing of Ballu, Flageul stenography, which is a derivative of Duployé, Brother Isidore Clé's stenography as used in Belgium, the stenography of Prévost-Delaunay, and then devoted all his ingenuity to the construction of a system. This system, at which he is patiently working, he wisely prefers to perfect before submitting to the criticism of competent judges.

In my opinion we ought to pay great attention to the requirements of phonography when choosing stenographic characters. Conversely, it seems to me that the adoption of a system of phonography should be to a certain extent subordinated to the transformation of this system into stenography. I say, "to a certain extent," for it would be a pity if the claims of rapid stenography, experts at which will always be a small body of people, were to prejudice the good settlement of a phonography suited to the great majority of the blind.

ORDINARY STENOGRAPHY (FOR THE SIGHTED).*—From an enquiry which I made into the different systems of ordinary stenography, the fact at once emerges that we cannot make use of systems like that of Prévost modified by Delaunay, where phonetism is suppressed from the very first lesson. Of the phonetic systems of stenography, one of the best is that of Aimé-Pâris. It competes with Prévost-Delaunay in the matter of speed, and is very much easier to learn. It is applicable to all European languages, and is structurally a phonography convertible into stenography; and this is the essential point for us. In other words, according to this system the pupil first of all learns an elementary stenography which is purely phonographic.

Abbé Duployé, whose method is most generally known, has merely modified the Aimé-Pâris graphic signs. Indeed, transcribed into point-writing, the elementary stenographies of Aimé-Pâris and Duployé are almost identical.

Whilst the Duployé system counts its pupils by thousands, experts at the Aimé-Pâris method have practised closely among themselves; but this has not prevented them from having a large number of candidates passed at examinations for admission to the great parliamentary services.

I think it is well to take as a groundwork two little books by Messieurs L. P. and Eugène Guénin.†

To these books, and also to the works of Duployé's successors (150, Boulevard Saint-Germain, Paris), I must refer those who may find the following explanations insufficient.

There are two fundamental elements in stenography, graphism, and the system of abbreviations.

Graphism consists in replacing ordinary letters by more simple signs. The well-known Conen de Prépéan chose straight and curved lines, variously inclined, for the representation of consonants, and little curved lines for the vowels. But since the

* It seems better to translate "Sténographie en noir" by "Ordinary Stenography" rather than literally by "Stenography in black."—*Translator.*

†L.-P. Guénin. *Cours de sténographie française.* Delagrave, Paris.

Eugène Guénin. *Leçons pratiques de sténographie.* Prudhomme, Paris, 1902.

position in which long lines could be placed were too few, he classified consonants and vowels as *principal* and *secondary*.

Take for instance the hard consonants—

te, che, ke, fe, pe, and *se.*

These have as their analogues the soft consonants—

de, je, gue, ve, be, and *ze.*

In the Conen de Prépéan system these second six consonants are represented by the same lines as the first six. They are differentiated from them by having a little transverse line superadded. This is called a *secant*, entails lifting the pencil, and thereby considerably diminishes the speed of writing. In the interest of speed the stenographer omits the secants. This omission hardly affects legibility, for, in the main, stenography differs from phonography in that it expresses mutilated words by faulty pronunciation. The stenographer will write, for instance, "Tites ponchour à Chan," for "Dites bonjour à Jean."

In elementary stenography, to express the nasals, *an, in,* &c., there are also signs which modify the vowels. These enact a rôle analogous to the secants, and are omitted in rapid stenography.

Besides the increase of speed which results from the substitution of simple signs for the usual alphabet, stenography gains by the suppression of vowels in certain cases, and above all by omission of mute letters. This means a considerable shortening, especially in French.

Lastly, the replacement of groups of sounds or of whole words by conventional signs or abbreviations is permitted.

Elementary stenography, then, is a phonography founded on the principle that "a sign, and always the same sign, corresponds to each speech-sound."

It is therefore readily conceivable that for children, and illiterates in general, elementary stenography is much easier to understand than ordinary writing; and that, on the other hand, those who have learnt it with such signs as secants (even if during their studies of orthography and grammar it has been

put aside) will not have much difficulty in acquiring rapid stenography by suppressing the secants and employing additional signs, as soon as they choose to do so.

What I have just said is a matter of experience and not of imagination.

M. Robin, as has been mentioned previously, when he was director of the Prévost orphanage at Cempuis found it very good practice to teach the children Aimé-Pâris stenography before ordinary reading and writing. According to his experience this simple and logical stenography was learnt by young children with wonderful rapidity. Afterwards it aided in their study of writing and orthography. Instead of dictating, the master wrote stenographically on the blackboard the subject of the class exercises, which the pupils had to translate into ordinary writing. This apparent détour, so far from increasing the duration of elementary studies had actually the result of shortening them. The same thing occurs in teaching music. In this case reading on the stave is learned much more quickly and easily, if the Galin-Pâris-Chevé numerical method of reading music has first been acquired.

The Pâris of this musical method, by the way, is the same Aimé-Pâris who has already been mentioned in this chapter, and also in the chapter on mnemonics. He was an old man when I attended several of his lectures about 1865. It is probable that in his youth he knew the works of Barbier, for the similarity between some of the ideas of these two eminent men can hardly be the outcome of chance.

It goes without saying that this phonography is far from giving all the shades of difference in pronunciation. For example, it does not distinguish between *o* and ô. If I mistake not, according to M. Passy, a complete phonographic table would contain more than one hundred and fifty signs.

I shall set down in the first place, in as orderly way as possible, the speech sounds as arranged for the French language by Aimé-Pâris, with their derivatives placed under the standard line; and beneath them their analogues, arranged by the pupils of Aimé-Pâris for several languages.

Stenographic Table of Aimé-Pâris.

French.

te	ne	me	re	le	se	ke	fe	pe	a	é	i	o	ou	u	eu
de	gne			lle	ze	gue	ve	be	an		in	on			un
					che										
					je										

*German.**

te	ne	me	re	le	se	e	fe	pe	a	é	i	o	ou	u	eu
de					ze	gue	ve	be	ang		ing	ong	oung		
						che									

English.†

te	ne	me	re	le	se	ke	fe	pe	a	é	i	o	ou		eu
de					ze	gue	ve	be							ung
th					che										
					je										

Italian.‡

te	ne	me	re	le	se	ke	fe	pe	a	é	i	o	ou
de	gne			gl	tche	gue	ve	be					

Stenography is with greater difficulty applicable to Esperanto, because stenographic abbreviations in general presuppose that the reader has a perfectly sound knowledge of the language concerned, the pronunciation of which must be given proper effect to in spite of the mutilation brought about by rapid stenography.

---

* In Germany a supplementary sign for aspirate *h* is introduced.

List of German words which illustrate pronunciation of the speech sounds in the above table: *T*asse, *d*ie; *n*ein; *M*utter; Rabe; *L*and; das, *s*o; *K*ind, *g*eben, i*ch*; *V*ater, *W*asser; *P*apier, *B*irne; *a*rm, l*a*ng; *L*eben; T*i*tel, Här*i*ng; *O*hr, *O*nkel; d*u*, Zeit*u*ng; K*ü*he; b*ö*se.

† List of English words which illustrate pronunciation of the speech sounds in the above table: *T*ie, *d*o, *th*ink; *n*eat; *m*eal; *v*ery; *l*ead; *s*o, easy, *sh*e, plea*s*ure; *c*an, *g*ive; *f*ee, ha*v*e; *p*an, *b*ear; *l*ast; bread; people; door; proof.

‡ List of Italian words which illustrate pronunciation of the speech sounds in the above table: *T*avola, *d*anza; *n*iente, montag*n*a; *m*adre; *c*arta; *l*ingua, fi*gl*io; si*c*uro. *s*cena; *c*apello, *g*ola; *c*atello, *v*acca; *p*adre, *b*ambino; *c*ara; che; *o*ra; *s*ole; chi*u*so.

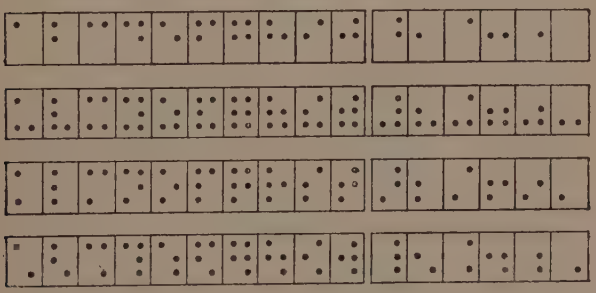
The adoption of an identical phonetic stenography for several languages has this valuable quality, that the student working without assistance to learn a foreign language will not make gross mistakes in pronunciation. A Frenchman will not say *Sakespéare* for *Chékspir*, *Jentleman ridé* for *Djentlemène raïdère*, and an Englishman will not say (as I have heard it pronounced) *Honai soit coui mel aï pennce*, for the motto *Honni soit qui mal y pense*.

Adaptation of Aimé-Pâris Stenography.—In order to arrange a point phonography which can be transformed into stenography we may make our first or *standard line* by means of the fifteen combinations which can be got out of the points 1, 2, 4 and 5.*

To make this standard line I first of all write the ten signs of the Braille standard line, and. following it, the five remaining thin signs which can be made in the upper row. These latter are the combinations 4-5, 2, 4, 1, 2-5 and 5. Under this standard line are placed the three derived lines which are afforded, as in the Braille table, by the addition of points 3 and 6. I thus obtain a complete table of the sixty-three signs which are possible with the rectangular cell.

This is the table :

Table of the Sixty-three Signs in four lines.



* See Note on page 132.

It need hardly be said that the signs, used in this way, lose their ordinary meaning, with the exception of the first ten which express the ten numerals.

It will be noticed that our standard line only contains fifteen signs, whilst that of Aimé-Pâris contains sixteen (*see* table on page 144).

In this same table (page 144), it can be seen at a glance that there is a number of derived signs, French and English, in the sixth column. A tenth consonant column ought, therefore, to be added, especially as it seems necessary for Esperanto. In other words the employment of ten principal consonants has the advantage that the derived consonants can all be included in the second line.

On the other hand the utility of seven vowel columns is hardly apparent except for French and German. In the interests of an international phonography, which necessitate reciprocal concessions, we ought to introduce ten columns for the consonants and content ourselves with five for the vowels. And that is what we shall do.

Before taking, as did Duployé, ten consonant types instead of the Aimé-Pâris nine, I was anxious to consult M. Guénin, the Senate's stenography examiner and duly appointed trustee of the Aimé-Pâris tradition. M. Guénin informed me that for graphic reasons Aimé-Pâris only took nine type signs to represent the consonants. For us, no such reasons exist. Respect for the master's memory does not prevent us using the ten first signs of our standard line for this purpose.

As I am not aware of any other important reason which might determine the order of the speech sounds, it seems to me proper to adopt that employed in the Aimé-Pâris mnemonic system, because it offers great advantages to those who wish to use this system. In order that the signs may retain their numerical meaning, to which all blind people are accustomed, I place the zero of the mnemonic system last, and then the ten first signs of the standard line represent the articulations :

te ne me re le che que fe pe se

Five signs only are left to us for vowels, and we must make the best of it :

We write the principal vowels in the order :

a e i o ou

The choice of *ou* as a principal vowel instead of *u* is influenced by the fact that *u* does not exist in some languages, and the transference of the sound *e* or *eu* to the condition of a derivative will cause little inconvenience, if it be noted that in the tables of Aimé-Pâris stenography in various languages this sound *eu* had no derivatives. Further, two-point signs have been preferred for *a* and *o* because, according to M. Guénin, it is most important that these two vowels should be easily recognisable.

It will be observed also that we have exclusively employed thin signs for the vowels, because correct reading of vowels is of such secondary importance that, especially in England, some stenographers omit them altogether. If, by way of experiment, all the vowels in a sentence be replaced by a constant sign, such as *x*, it is usually possible to guess the meaning of the sentence ; but if the consonants be replaced by *x* the result is hardly intelligible.

Take for example :

donnerait un texte absolument inintelligible.

Replacing the vowels by *x* we have :

dxnnxrxxt xn txxtx xbsxlxmxnt xnxntxllxgxblx.

Replacing the consonants by *x* we have :

xoxxexaix ux xexxe axxoxuxexx ixixxexxixixxe.

Next follows, in accordance with the foregoing indications, the table in print of phonographies in different languages, including Esperanto.

MODIFICATION OF THE AIMÉ-PÂRIS STENOGRAPHIC TABLE.

French.

te	ne	me	re	le	che	ke	fe	pe	se	a	é	i	o	ou
de	gne			lle	je	gue	ve	be	ze	an	eu	in	on	u
					se						è	un		
					ze									

German.

te	ne	me	re	le	che	ke	fe	pe	se	a	é	i	o	ou
de				ye	ich	gue	ve	be	ze	ang	eu	ing	ong	u
					ach					äng			oung	
													üng	

English.

te	ne	me	re	le	che	ke	fe	pe	se	a	é	i	o	ou
de				ye	je	gue	ve	be	ze		eu	ing	ong	oung
th(ing)											eung			
th(us)											äng			

Italian.

te	ne	me	re	le	che	ke	fe	pe	se	a	é	i	o	ou
de	gne			ye		gue	ve	be						

Esperanto.

te	ne	me	re	le	che	ke	fe	pe	se	a	é	i	o	ou
de				ye	je	gue	ve	be	ze					ou(short)

It will be seen that in order to make a complete phonography, we have taken, in some languages, a few signs only outside the first two lines, and that a certain number of places remain available in the second line.

I shall give only two examples of the use of the two last lines of this table.

Suppose one write with the signs of the first line. The most frequently occurring consonants are *r* in French and *n* in Esperanto, and it can be resolved that the addition of the point 3 represents the letter *r* and that of the point 6 the letter *n*. A very considerable abbreviation will be obtained by this transformation, analogous indeed to what stenographers call the use of metagraphic signs.

There remain over in all languages more than half the signs of the table, available either for punctuation marks or abbreviations.

The study of stenography, with phonography as a ground work, is accomplished in two steps. The first is taken almost automatically by the mere fact of reading phonography, because after a short time no notice is taken of the impressions given by points 3 and 6. Very soon, if phonography be regularly used for writing, time is saved by the writer only using points 1, 2, 4, and 5 ; this of itself means the employment of a smaller number of signs than is necessary for contracted Braille.

The second step, taken only by a small number of experts, is the study of abbreviations.

To make the temptation to use only the signs of the first line still stronger, I have employed two points and not one only as characteristic of the second line. There is another advantage in this, namely, that abbreviations will usually consist of only one of the points 3 and 6.

Further, the rectangle might be replaced by an opening of more complex outline :

The upper part would form a square for pricking out the points 1, 2, 4, and 5, with the lower side open in the middle ; so that the style, without being taken off the paper, could travel down and mark points 3 and 6 in the two acute angles, right and left, of the trapezium formed by the lower part of the opening. By this method the marking of points 3 and 6 would take longer, but 2 and 5 would be more quickly and accurately placed. These two points have been the bane of all stenographies and abridgments hitherto introduced.

If phonography be set up in type it would perhaps be necessary to take into consideration the indications given on pages 124 and 125, with regard to typography, and to substitute, especially for the additional points 3 and 6, a little straight line.

It must be understood that these remarks on the adaptation of Aimé-Pâris stenography are merely tentative, and such as may form a basis for discussion. In the foregoing point-table (page 145), the order of the signs is unmethodical, because the ten first Braille signs have been carefully retained unaltered.

No one is more alive than myself to the imperfection of this adaptation, especially from the graphic standpoint (see note, p. 156)

FOREIGN SYSTEMS OF STENOGRAPHY.—The description of these ought to come in at this point; I am, however, unfamiliar with them. In order to construct an international phonography, it is necessary to be acquainted with these foreign systems, and I must be content to notify this important hiatus to those colleagues who have expressed a desire to translate my work. I am told that *Kurzschrift*, which the Germans have adopted at their Congresses, is well constructed and adaptable to other languages.

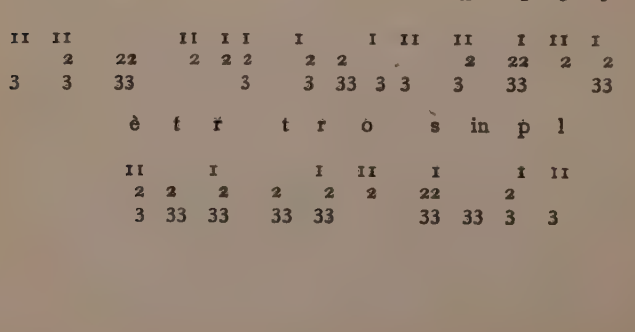
MODIFICATION AND EXTENSION OF BARBIER PHONOGRAPHY.—If we simply replace the two rows of points made use of by Barbier by the two columns of the Braille notation, the three points 1, 2, and 3 of the latter, either alone or combined, furnish seven characters, namely, 1, 2, 3, 1-2, 2-3, 1-3. and 1-2-3. Rejecting the second, formed of the point 2, as being more difficult to prick out rapidly with the style, we can express the numbers:

one two three four five six

respectively by the points

1 3 1–2 2–3 1–3 1–2–3

Proceeding in exactly the same way with the three points of the left-hand column we find that our phonographic writing has a height of three points instead of six. It will be more easily read by the finger, but will necessitate an apprenticeship of a few extra minutes to understand the foregoing representation of the first six numbers by means of three points. Barbier's sentence on page 79 will now be written:



Barbier phonography when thus reduced to three points in height, gives a writing at least as concise as contracted Braille, and sharper to the touch, since not a single thin sign is used.

Let us now try and extend the compass of this phonography so as to make it transformable into stenography. If we choose to make use of all the possibilities of our cell, the column of three points provides eight signs, allowing that, besides the seven combinations of the three points, the absence of any point is equivalent to a sign. We necessarily fall back upon sixty-three combinations. If we designate respectively by 0, 1, 2, 3, 4, 5, 6, and 7, the thin combinations of the left, and the thin combinations of the right hand column, without making any attempt to determine the combination of points which will be designated by any one of these eight figures, we are forced to draw up the following square table; I say forced, because the table has nothing arbitrary about it; it comes naturally.

THEORETICAL SQUARE TABLE.

0	0-1	0-2	0-3	0-4	0-5	0-6	0-7
1-0	1-1	1-2	1-3	1-4	1-5	1-6	1-7
2-0	2-1	2-2	2-3	2-4	2-5	2-6	2-7
3-0	3-1	3-2	3-3	3-4	3-5	3-6	3-7
4-0	4-1	4-2	4-3	4-4	4-5	4-6	4-7
5-0	5-1	5-2	5-3	5-4	5-5	5-6	5-7
6-0	6-1	6-2	6-3	6-4	6-5	6-6	6-7
7-0	7-1	7-2	7-3	7-4	7-5	7-6	7-7

This theoretical table is capable of giving origin to an immense number of point-tables, according to the combinations of points which may be chosen to represent the numbers 1, 2, 3, 4, 5, 6, and 7. There is not even any compulsion to choose the same

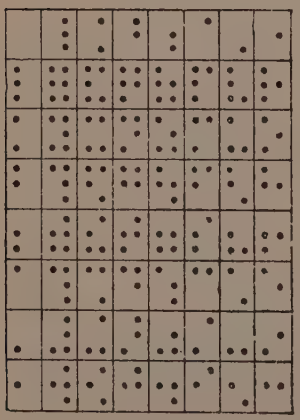
combination of points to represent the seven figures of the first column and the seven figures of the first line, and the choice, which is a matter of graphism, cannot be judiciously made except by collaboration between stenographers, polyglots, and blind people. It must, therefore, be quite understood that the following point-tables are only given here as examples.

Continuing to follow Barbier's method, we must prepare tables in print. Since the pupil has to learn these by heart they require to be arranged in a logical manner. Here again there are innumerable possible solutions, and even supposing that every person were to think alike as to the arrangement of the point-table, various personal inclinations will make it very difficult to agree upon an arrangement of the printed table.

From my point of view the question of stenography should come second and the positions chosen for the printed signs should correspond to those point signs which are easily legible.

First Example.—Let us inspect the following double table :

SQUARE TABLES OF THE SIXTY-THREE SIGNS IN POINTS AND IN PRINT.



	a	i	o	ou	é	eu	u
a	p	b	*pr*	*br*	*pl*	*bl*	an
i	t	d	*tr*	*dr*	.	.	in
o	f	v	*fr*	*vr*	*fl*	*vl*	on
ou	k	g	*cr*	*gr*	*cl*	*gl*	r
é	ch	j	.	.	.	.	.
eu	s	z	.	.	.	.	l
u	m	n	.	.	.	.	un

In this table there is an ample number of signs to represent the vowel-sounds and speech-sounds of the French language. The first column comprises the seven vowels, *a*, *i*, *o*, *ou*, *é*, *eu* and *u*. In the interest of languages which do not have the sound *u*, I have represented this vowel by the point 2, which is difficult to read and to write. The order of the vowels is awkward for Esperanto and for Barbier; these, for different reasons, place the *é* after the other simple vowels. In the last column are the four nasal vowels which only exist in French, a vacant square, and the liquid consonants *r* and *l*; these latter are so placed because in the formation of words they enact a rôle approaching that of the vowels.

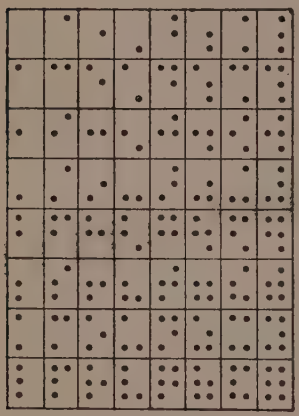
The second and third columns contain the fourteen consonants which, with *r* and *l*, give the sixteen speech-sounds necessary in phonography.

In the foregoing phonographic table I have added several speech-sounds terminating in *r* and *l*, which can be easily turned into metagraphic signs.

In this table no thin signs are used to represent consonants; this leads to greater certainty in reading, and, as regards writing, to saving of the time required for separating words. If the vowels of my first column be used at the ends of words, and be replaced at the commencements of words by the seven signs of the first horizontal line, which cannot lead to confusion, there will result a distance of one or two points between words. When writing rather quickly one need only separate the words when the first of two consecutive words ends, and the second begins with a consonant. The only inconvenience of this method is that vowels in the middle of words will simulate intervals between words. This inconvenience almost vanishes in stenography, because the writer who is so hard pressed as to find it useful to neglect the spaces will certainly suppress most of the vowels in the middle of words.

Second Example.—All the foregoing remarks are valid in their application to the following table. It must be thoroughly understood that the thin signs in the first horizontal line merely represent the same vowels as those in the first column.

SQUARE TABLES OF THE SIXTY-THREE SIGNS IN POINTS AND IN PRINT.



	a	u	i	o	ou	é	eu
a	al	*an*	ar	pl	pr	p	b
u	ul	*un*	ur	tl	tr	t	d
i	il	*in*	ir	fl	fr	f	v
o	ol	*on*	or	kl	kr	k	g
ou	oul	oun	our	l	r	m	n
é	el	en	er	chl	chr	ch	j
eu	eul	eun	eur	sl	sr	s	z

Simple Phonography.—It is only necessary to learn by heart the seven vowels of the first column, the seven consonants of the second last column, the seven consonants of the last column (which are derived from the preceding seven), and, finally, to obtain a grasp of the form of the letters *l* and *r*. That makes twenty-three signs, sufficient for most European languages. In French, the four nasal-vowel signs are to be added. In the table they are italicised and face the letters *a*, *u*, *i* and *o* respectively. In German, *ch* is substituted for *j*, etc. In English, Italian, Esperanto, etc., the sign *u* will be used no longer. Indeed there is hardly a language in which these twenty-three signs are insufficient for phonography.

Phonography with Symphonics.—A symphonic sign is one which expresses more than one speech-sound. Since we have expended twenty-three signs, there are forty left. Deducting the thin signs of the first line, thirty-three can be used as symphonic signs (if we do not take into account the fact that the four signs, used only in French for the nasal vowels, are wasted). Since the letters *l* and *r* are liquids, and easily associated with conson-

ants, I suppose they furnish more symphonics than the others, in all languages. That is why the second, fourth, fifth, and sixth columns of the table are filled with symphonics of these two letters. It is easy to remember that the addition of these letters after a vowel is made by adding a single point, above for *l*, and below for *r*; and in the same way are formed the twelve symphonics which they make with other consonants. Though some of these symphonics do not occur in French, they have been retained because they exist in some other languages, especially the Slavonic.

More complete Stenography.—Slavonic words appear to us to be crammed with consonants, but that is really because, as a rule, an unwritten vowel is sounded slightly between consecutive consonants. Stenographers who use a similar device, viz., the unpronounceable syllables of the table we are considering, are prepared for the introduction of signs representative of these abbreviations. It need hardly be said that in stenography, the consonant signs of our eighth column will disappear whenever an *l* or an *r* is associated with them, and be replaced by the symphonics of the corresponding hard consonants.

I have but one object in making all this explanation, and that is to shew by an actual example that it is possible to reconcile phonography and stenography without doing very much damage to the latter. The legibility of the phonography which has been sketched out is rather increased by the use of symphonics, and is hardly diminished by the suppression of some of the intervals between words. It is my belief that, with practice, phonography of this kind, for the very reason that it takes up less room, will be more quickly read than contracted or uncontracted Braille.

Instruction in Reading.—In 1889 I published a *System* of reading instruction for use in primary schools (see page 157 *Useful Addresses*). I must refer the reader to the preface of this little book for an explanation of the principles by which I have been enabled to shorten the teaching of reading, and to make it less tiresome. It happens that my methods are quite well adapted to the study of phonography in embossed points, whatever system of signs be adopted. Once he learns the four

most common letters of European languages, *a*, *i*, *r*, and *l*. the young blind person will be able to read words and little sentences such as: Le riz—Le lilas—Le rat—L'île—Il lit—Il lira—Lili a ri—Lili rira—Lili relira.

I am busy preparing an apparatus with moveable letters, and a little book of instructions to be used by such teachers of the blind as care to experiment with it.

Conclusion.—Those interested in embossed stenography will be well advised to communicate, regarding the French language, with M. Dechaux, piano tuner, Boulevard de Courtais, Montluçon (Allier), and regarding international stenography with M. Monnier, 10, Champel, Geneva.

Each of them reads Esperanto and will act as a medium of communication for anyone who may wish to endow us with an international stenography, which is still to seek. In the working out of such a stenography I trust that the requirements of the great mass of the blind will be borne in mind, and that the system will conform to the following proposals:

1. *The stenography to be formed should have phonography as its basis.*

2. *It is important that simple phonography shall pass into rapid stenography through a writing which continues to be phonetic, and therefore international. The pronunciation of the abbreviations used in this writing must be settled with certainty.*

Such writing would have the effect of increasing the rapidity of reading.

Again, for teachers of the blind I shall add this final proposal:

3. *Reading should be first of all taught phonographically. This does not exclude the future study of orthography.*

Note referred to on p. 149. For the benefit of those interested in the subject it may be mentioned that an account of M. Depoin's adaptation of Duployé stenography will be found in the original, and also in the German translation of Entre Aveugles.—*Translator.*

CHAPTER XXVIII.

USEFUL ADDRESSES.

In every country one must, of course, apply to the special blind schools for most of the things which blind people use, such as writing frames, paper, charts, games, etc. For instance, at the Paris National Institution, 56, Boulevard des Invalides, can be obtained reglets, frames, styles, cubarithms, coarse paper, etc., and also a certain number of classical books. There is a printed catalogue of prices of all these things.

The Prague frame can be obtained from the K. K. Blinden-Erziehungs-Institut, 11/2 Wittelbachstrasse, No. 5, Vienna (Austria). Price 4 marks 50 (4s. 6d.).

The Berlin Institution is especially well stocked with games.

There are also special associations for the benefit of the blind, such as the Valentin-Haüy Association, 31, Avenue de Breteuil, Paris; the British and Foreign Blind Association, 206, Great Portland Street, London, W.; the International Association of Blind Students, 10, Champel, Geneva; M. Boyer's Blind School at Dijon where blind foreigners of every age can live *en pension*; Dr. Sommer's private establishment, 7, Greves Garten, Bergedorf, near Hamburg (Germany), etc. At all of these places one is sure of a cordial welcome.

The catalogue of embossed-type books can be obtained at the British and Foreign Blind Association and at the Valentin-Haüy Association. The former forwards when requested a catalogue of articles for sale; the latter lends out books, and has depôts in several provincial towns. Besides the works of M. de la Sizeranne, adults who wish to learn Braille by themselves can obtain from this Association Captain Mouchard's book; and also Dr. Javal's for the study of contractions.

As regards hotels for the blind, in Paris the Private Hotel at 4, Rue Bertrand, quite near the Institution (7 francs per day), and in London Miss Blott's boarding house, 30, St. Charles' Square, North Kensington, W. (150 francs per month = about £6 6s.), are recommended.

Watches for the blind can be bought in Paris from Ledeux, Place St.-André-des-Arts (30 francs, or about 25s.), and from Hass, Boulevard Sébastopol; in Strassbourg from Biettner Oscar, Alter Fischmarkt.

The tandem tricycle is sold by the La Française Company, 16, Avenue de la Grande-Armée, Paris (600 francs, about £25).

Wax tablets are made by Carrière, 22, Rue St. Sulpice, and 54, Rue de l'Arbre-Sec. Paris.

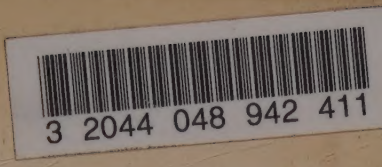
The writing table can be obtained from Giroux, 19, Rue de l'Odéon, Paris (40 francs, about 32s.).

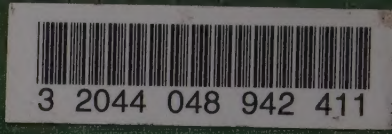
Playing cards at Les Frères St. Jean de Dieu, 223, Rue Lecourbe, Paris.

Lehrmittel Verlag der Blindenanstallt, Illzach, Mulhausen, 1903. Catalogue of things used in teaching the blind, which are manufactured at Illzach, near Mulhouse. For instance, the geographic atlas containing 84 plates. Price 30 pfennigs each (about 3½d.)

A writing machine for the blind which is light and silent, and of moderate price, is in course of construction by M. Bivort, 33, Rue J. J. Rousseau.

Encyklopädisches Handbuch des Blindenwesens, by Professor Mell, 2 vols., in 8vo. Pichler, Vienna and Leipzig, 1900.


3 2044 048 942 411


3 2044 048 942 411